

CLINICAL CHARACTERISTICS AND HAEMATOLOGICAL TRENDS IN PAEDIATRIC CASES OF DENGUE: A SINGLE CENTRE RETROSPECTIVE STUDY IN CHENNAI, TAMIL NADU.

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Abstract

Aim:

This study is an attempt to perform an analysis about the clinical profile, serological indicators and predictors of dengue in children.

Materials And Methods:

The study was conducted including paediatric dengue admissions into a tertiary care teaching hospital in Chennai. Children under the age of 15 were included in the study. The demographic details, clinical characteristics and laboratory findings of these patients were collected by reviewing medical records and the data was entered into a standardized data collection sheet.

Results:

In the study, it was found that the mean age was 8.5 years. It was found that males (59.6%, n=34) were slightly more affected than females. On clinical examination, 24.5% of the subjects showed hepatomegaly and 5 cases of the subjects showed fluid accumulation in the abdomen. A majority (66.6%) of the subjects showed thrombocytopenia; with 31 having mild to moderate thrombocytopenia and 7 children having severe thrombocytopenia. An elevation of serum SGOT levels (>120 IU/L) was seen in about 80.7% of the patients. About 12% of the subjects showed hyponatremia.

Conclusion:

It is observed in our study that the presence of prodromal symptoms such as fever, arthralgia, vomiting and lethargy does not preclude the diagnosis of dengue. Severe dengue was associated with a large decrease in platelet counts with severe thrombocytopenia leading to shock in the majority of the cases. Elevated liver enzymes were an added feature with the Transaminase levels being ten times the upper limit of normal. Hyponatremia was also a notable laboratory derangement.

Recommendation:

The over the counter (OTC) drug acetaminophen can help reduce muscle pain and fever. But if you have dengue fever, other OTC pain relievers like aspirin, ibuprofen (Advil, Motrin IB, others) and naproxen sodium (Aleve) should be avoided. These pain relievers can increase the risk of dengue fever bleeding complications.

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1. Introduction.

Dengue is one of the most common vector-borne diseases in the world. Epidemiologically, it is estimated that dengue infects more than 50 million people each year and around two and a half billion people are at risk of infection [1]. It is caused by an arbovirus that is a single stranded positive sense RNA virus, belonging to Flaviviridae family and has 4 serotypes {1, 2, 3, and 4}. Dengue is now endemic in over 100 countries, resulting in 40% of the world's population living mostly in urban and semiurban settings being at risk for dengue [2, 3]

The clinical presentation of DF is triphasic with the febrile phase typically characterized by high fever, headache, myalgia, body ache, vomiting, joint pain, transient rash and mild bleeding manifestations such as petechiae, ecchymosis at pressure sites and bleeding from venipunctures [4]. In the next critical phase, there is a heightened risk of progression of the patient to severe dengue which is defined by presence of plasma leakage that may lead to shock and/or fluid accumulation such as ascites or pleural effusion with or without respiratory distress, severe bleeding, and/or severe organ impairment [3-5]

Although there is no specific treatment and vaccine for dengue in public use, careful monitoring of hemodynamic and hematologic parameters, volume replenishment and close observation for the signs of severe dengue in patients can reduce dengue's morbidity and mortality [2]. In this study, the aim was to analyse the patterns of clinical presentation, haematological trends in dengue with/without warning signs and predictors of outcome in severe cases of dengue in paediatric age group.

2. Methodology.

2.1. Study area.

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2.2. Type of study.

Retrospective study.

2.3. Sampling method.

Universal sampling method.

2.4. Inclusion criteria.

All patients aged below 15 years, who sought medical care in the pediatric department of Saveetha Medical college, with a laboratory confirmed diagnosis of dengue were included in this study. Prior permission was obtained from the Institutional Ethics Committee. The parents/legal guardians of the child provided informed consent.

2.5. Exclusion criteria.

Children with any preexisting haematological or any other systemic illnesses were excluded.

Sample collection: The demographic details (name, age, sex, address), presenting complaints and examination findings of individual patient was collected. Laboratory findings and radiological investigations like ultrasound abdomen were documented if available. Details of any evidence of previous dengue infection were also documented.

Statistical Analysis: Statistical Analysis was done using SPSS software. Qualitative data are expressed in the frequencies and percentages. Descriptive statistics were represented by Mean and standard deviation. For inferential statistics, the chi square test for association was used. p value less than 0.05 was considered as significant.

3. Results.

A total of 57 cases that were enrolled in the hospital over the past three years were taken into consideration. At the initial stage a number of 100 patients were examined for eligibility, however 43 patients were excluded from this study due to not being eligible. The mean age was 8.5 years, with the youngest child being 8 months old and the oldest child being 14 years. 22.8% of the study population were less than 5 years. Another 36.8% were between 6-10 years and the rest 40.4% were between 11-14 years, this is shown in Table

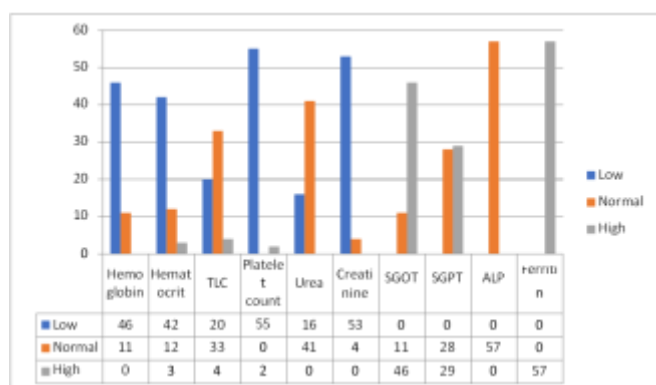
1. 59.6% were males and the rest 40.4% were females, as shown in Table 2.

Loss of appetite, diarrhea and headache were present in 10.5% respectively. 47.4% had abdominal pain, 43.9% had fever, 8.8% had nausea, 61.4% had vomiting, 29.8% had lethargy, 17.5% had arthralgia, 7% had mucosal bleed (seen in Table 3). The distribution of these symptoms is shown in figure 2. Although a majority of the children had been infected with dengue for the first time, 10.5% had a previous episode of dengue (table 4). Dengue was confirmed through serological markers, which showed that Ns1 was positive among 31.6% of the study population, IgM among 81% and IgG among 24.6%, as seen in Table 5.

The blood parameter analysis, shown in Table 6, states that around 81% of the subjects had anemia. 73.7% had low hematocrit, 35% had leucopenia, 66.6% had thrombocytopenia. SGOT was high in 81% of the cases, while SGPT was high among 51%. ALP was normal in all the study subjects.

Hyponatremia was noted in about 12.3% of the subjects. The distribution of these statistics has been highlighted in Figure 3. Of the total 57 cases, 22.8% (n=13) of them were found to develop severe illness, with shock like symptoms.

Fig 3: Distribution of study population according to blood parameters



4. Discussion.

In the study, it was found that males were slightly more affected than females, with more chances of developing severe illness with shock like

symptoms, which was also noted in other studies associated with dengue prevalence in children. This maybe probably be attributed to the presence of more exposed skin surface area, leading to higher chances of acquiring mosquito-borne diseases [2, 6]. The majority of the children who were affected were between 11-14 years..

On the basis of history, the most common presenting symptom was vomiting followed by abdominal pain and fever. Other predominant symptoms present in children were arthralgia, loss of appetite, headache and diarrhoea. About 7% also had bleeding manifestations, presenting in the form of mucosal bleed, which is another finding noted in severe cases of dengue. Fever was the symptom which was present for longer duration in most of the subjects. This symptom pattern is similar to those reported in several other studies performed for assessing the clinical pattern of dengue [7, 8]. This shows that most of the children who were confirmed cases of dengue had features like vomiting, fever and other prodromal symptoms; hence these can be considered as early markers for quick diagnosis and prompt treatment, which thereby prevents further progression to severe illness.

About 10.5% of the patients had a history of a previous episode of dengue. This can be attributed to the fact that patients can get a dengue infection from the other strains of dengue virus, post infection with one strain of virus; although this is very rare and is probably due to the various epidemics taking place in the city. On clinical examination, 24.5% of the subjects showed hepatomegaly, which is a common finding in many other reviews [9]. 5 cases of the subjects also showed fluid accumulation in the abdomen, and these children were found to progress to severe illness.

Among the various laboratory parameters, thrombocytopenia was the most common finding. A majority (66.6%) of the subjects showed thrombocytopenia; with 31 (54.3%) having mild to moderate thrombocytopenia and 7 children having severe thrombocytopenia (<0.5 lakh/mm³). Of the seven children who had severe thrombocytopenia, 5 of them and severe illnesses with

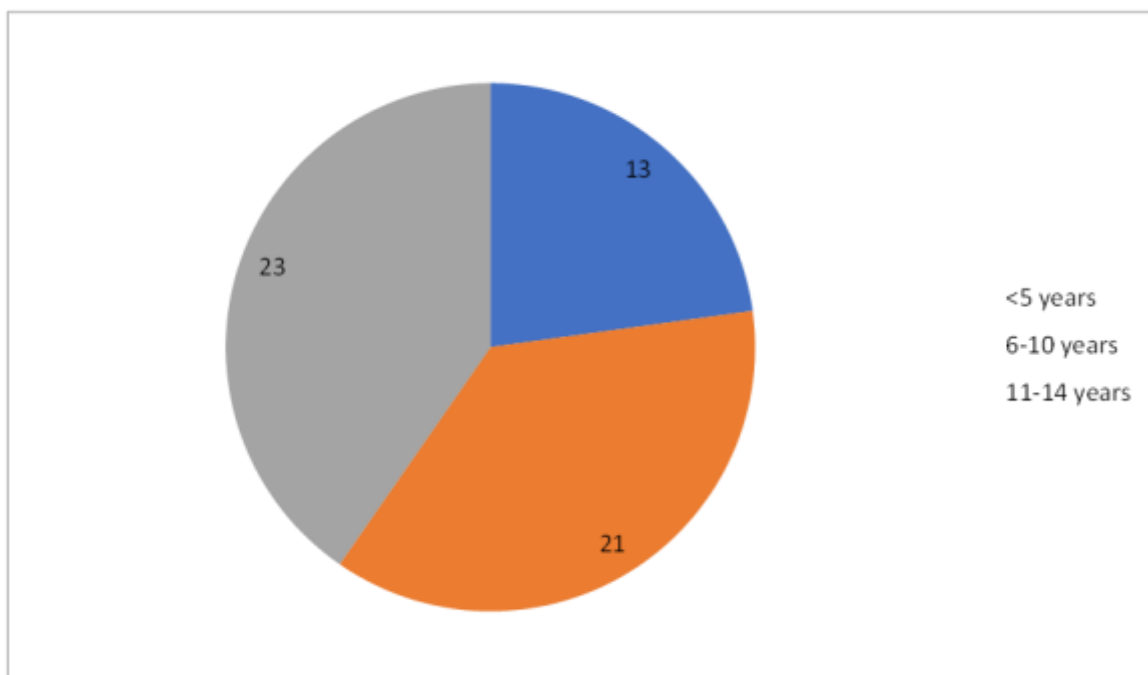


Figure 1: Distribution of study population according to age

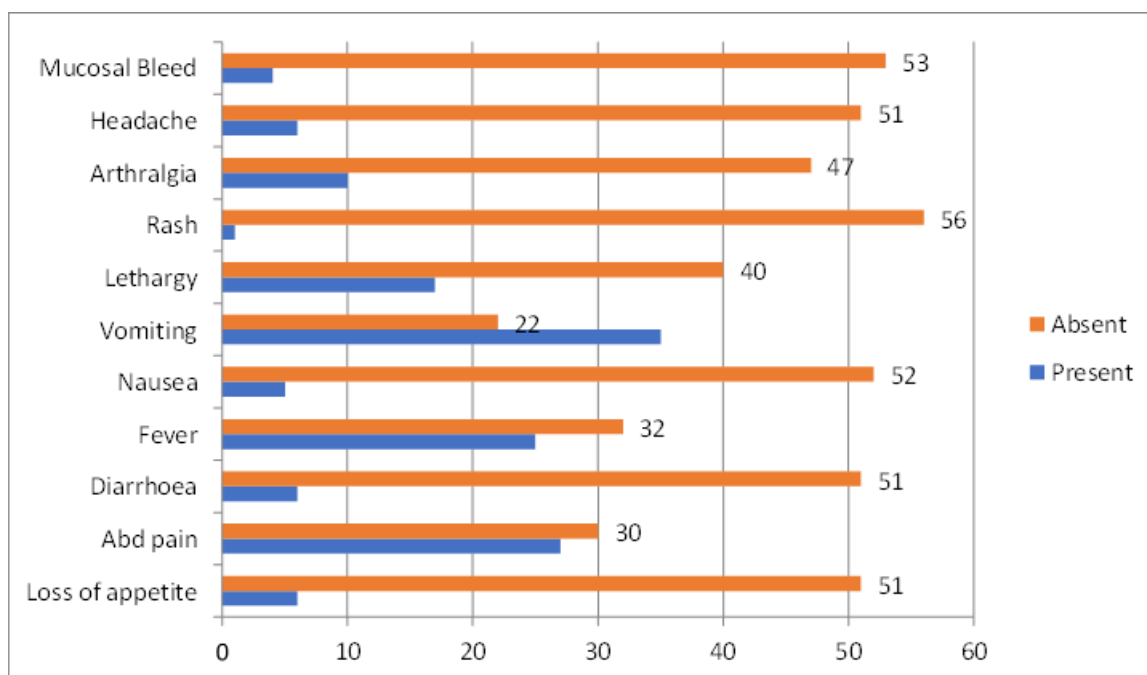


Figure 2: Distribution of signs and symptoms in study population

Table 1: Distribution of study population according to age

Age group	Number	Percentage
Less than 5 years	13	22.8
6-10 years	21	36.8
11-14 years	23	40.4
Total	57	100

Table 2: Distribution of study population according to gender

Gender	Number	Percentage
Male	34	59.6
Female	23	40.4
Total	57	100

Table 3: Distribution of signs and symptoms in study population

Symptom	Present		Absent	
	Number	Percentage	Number	Percentage
Loss of appetite	6	10.5	51	89.5
Abdominal Pain	27	47.4	30	52.6
Diarrhoea	6	10.5	51	89.5
Fever	25	43.9	32	56.1
Nausea	5	8.8	52	91.2
Vomiting	35	61.4	22	38.6
Lethargy	17	29.8	40	70.2
Rash	1	1.8	56	98.2
Arthralgia	10	17.5	47	82.5
Headache	6	10.5	51	89.5
Mucosal bleed	4	7.0	53	93.0

Table 4: Distribution of study population according to previous dengue status

Previous H/O dengue	Number	Percentage
Present	6	10.5
Absent	51	89.5
Total	57	100

Table 5: Distribution of study population according to serology

	Present		Absent	
	Number	Percentage	Number	Percentage
NS1	18	31.6	39	68.4
IgM	46	80.7	11	19.3
IgG	14	24.6	43	75.4

Table 6: Distribution of study population according to blood parameters

Criteria	Low		Normal		High	
	Number	Percentage	Number	Percentage	Normal	Percentage
Hemoglobin	46	80.7	11	19.3	0	0
Hematocrit	42	73.7	12	21.1	3	5.3
Total leukocyte count	20	35.1	33	57.9	4	7.0
Platelet count	38	66.6	17	29.8	2	3.5
Sr. Urea	16	28.1	41	71.9	0	0
Sr. Creatinine	53	93.0	4	7.0	0	0
SGOT	0	0	11	19.3	46	80.7
SGPT	0	0	28	49.1	29	50.9
ALP	0	0	57	100	0	0
Sodium	7	12.3	50	87.7	0	0
Potassium	1	1.8	56	98.1	0	0
Chloride	1	1.8	56	98.1	0	0
Bicarbonate	2	3.5	55	96.4	0	0
Ferritin	0	0	0	0	57	100

the development of shock. This indicates that decreasing platelet counts is an important parameter in the spectrum of illness in dengue; from diagnosis to being an important predictor of progression to severe disease manifesting as shock. This result is consistent with the many other reviews done on the laboratory parameters of dengue (2). Another significant lab finding was elevation of serum SGOT levels (>120 IU/L) in about 80.7% of the patients, which is similar to another pattern of elevated SGOT levels described in another study, indicating a positive correlation between the level of SGOT and severity of the illness (10). About 12% (n=7) of the subjects showed hyponatremia, of which 4 children developed severe illness, highlighting the slight importance of this parameter in assessing risk of developing severe illness.

5. Conclusion.

It is observed in our study that the presence of prodromal symptoms such as fever, arthralgia, vomiting and lethargy does not preclude the diagnosis of dengue. The course and severity of the

illness are highly variable. Apart from the described warning signs, severe dengue was associated with a large decrease in platelet counts with severe thrombocytopenia leading to shock in majority of the cases. Elevated liver enzymes were an added feature with the Transaminase levels being 10 times the upper limit of normal. Hyponatremia was also a notable laboratory derangement.

6. Limitation.

- Small sample size and period of study.
- Though statistically significant, may not be an actual representation of the community.
- Need a higher sample size from different populations and not those merely attending the tertiary care centre.

7. Recommendation.

The over the counter (OTC) drug acetaminophen can help reduce muscle pain and fever. But if you have dengue fever, other OTC pain relievers like aspirin, ibuprofen (Advil, Motrin IB, others) and naproxen

sodium (Aleve) should be avoided. These pain relievers can increase the risk of dengue fever bleeding complications.

8. Acknowledgement.

We are thankful to the patients; without them the study could not have been done. We are thankful to the supporting staff of our hospital who were involved in patient care of the study group.

9. List of abbreviations.

OTC- Over the counter
RNA- Ribonucleic acid
DF- Dengue fever
SPSS- Statistical Package for Social Sciences
H/O- History Of
IgM- Immunoglobulin M
IgG- Immunoglobulin G
SGOT- Serum Glutamic Oxaloacetic Transaminase
SGPT- Serum Glutamic Pyruvic Transaminase
ALP- Alkaline phosphatase

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11. Conflict of interest.

The authors report no conflicts of interest in this work.

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