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Original Research Article

A study on clinical profile in correlation with laboratory investigations and radiological findings in dengue fever

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Abstract

Background and Objectives: To study the clinical manifestation, laboratory and radiological findings pertaining to Dengue fever. To obtain the sociodemographic profile of patients. To evaluate the clinical features observed in dengue patients. To carry of comparative study of clinical features with the laboratory and radiological findings in dengue patients.
Methods: A purposive sampling study performed on 80 suspected cases of dengue from September 2019 to September 2021 which evaluated complete blood count, dengue serology, Serum electrolytes, Serum creatinine and BUN, Urinary PH, osmolality, creatinine, electrolytes, chloride and calcium, ABG, Random blood sugars, liver enzymes-SGOT, SGPT, PT and a PTT, Ultrasound abdomen, Chest X-ray.
Result: Evaluation of patients suspected with dengue was done and % cases was significantly proportional to age factor, gender, clinical history also a comparative study of symptomatology and clinical spectrum performed. The comparative distribution of patients with respect to signs, bleeding tendency, type of skin rash, torniquet test and other blood components was evaluated by statistical analysis and significance data was derived.
Conclusion: This study focuses on comparison of all factors assisted with and withdrawing its outcomes to develop strategies for prevention and cure of dengue in order to curb its spread via National health programmes.

Keywords: Urinary PH, osmolality, creatinine, electrolytes, chloride and calcium

Introduction

Dengue is most common mosquito-borne viral disease or arthropod borne disease that widens boundaries in all regions of WHO in recent years. It is spread by female mosquitoes mainly of the species Aedes aegypti and to a lesser extent by Aedes albopictus. Dengue is caused by a virus of the Flaviviridae family which has 4 types of related serotypes of the virus that cause dengue (DENV-1, DENV-2, DENV-3 and DENV-4) [1, 2]. These mosquitoes are also a cause of chikungunya, yellow fever and Zika viruses. Dengue has as impact range from mild clinical evidence to severe flu condition. Mosquitoes bite during the early morning and in the

evening but they may bite and thus spread infection at any time of day [2, 3] An infection can be acquired via a single bite. A female mosquito that takes a blood meal from a person infected with dengue fever thus becomes itself infected with the virus in the cells lining its gut. The virus spreads to other tissues including the mosquito's salivary glands and is subsequently released into its saliva about 8-10 days later. Aedes aegypti is particularly involved, as it prefers to lay its eggs in artificial water containers. Dengue can also be transmitted via infected blood products, organ donations, vertical transmission (from mother to child) during pregnancy or at birth [2, 3]. Other person-to-person modes of transmission, including sexual transmission, have also been reported, but are very unusual [3, 4]. Dengue infection is suspected in a patient with high fever and two of the following signs or symptoms: Headache, Retro-orbital pain, Myalgia, Arthralgia/ bone pain, Rash, Bleeding manifestations: petechiae, epistaxis, gum bleeding, hematemesis, melena, or positive tourniquet test, Leukopenia, Platelet count ≤ 150,000 cell/mm3, Haematocrit (Hct) rising 5-10%. Most people with dengue recover without any ongoing problems [4]. The risk of death among those with severe dengue is 0.8% to 2.5% and with adequate treatment this is less than 1% [4, 5]. However, those who develop significantly low blood pressure may have a fatality rate of up to 26% [5, 6]. The risk of death among children less than five years old is four times greater than among those over the age of 10. Elderly people are at higher risk of disease exposure [6, 7, 8]. In context of covid-19 and dengue government has initiated its stepin national vector borne disease programme.

Material and Methods

A cross sectional hospital-based study was conducted in Department of Paediatrics', Shadan Institute of Medical Sciences, Hyderabad, Telangana, India on individual aged between 1-18years have been included. Method for data collection was done by questionnaire consisting of Socio demographic profile, History of chief complaints, Present history and Past history, General examination and systemic examination and Investigations.

Inclusion criteria

1. Patient aged 1-18 years of age with suspected case of Dengue admitted as both inpatients as well as outpatient has been included.
2. Written informed consent was taken from parents on behalf of children.
3. Patients with symptoms of Fever<2weeks, pain abdomen, vomiting's, rashes or any bleeding, manifestations.

Exclusion criteria

1. Fever>2weeks were excluded.
2. Confirmed Cases of malaria, Typhoid, Tuberculosis was excluded.
3. Parents who have not given consent on behalf of children.
4. Devastated and debilitated persons (mental illness, physical disability,
5. medical illness).
6. Patients aged less than 1 and >18years excluded.

Results

Table 1: Distribution of participants according to age groups

Age groups	Frequency	Percentages
1-4 years	16	20%
5-8 years	22	27.5%
9-12 years	22	27.5%
>12 years	20	25%
Total	80	100%

Table 2: Distribution of participants according to gender

Sex	Frequency	Percentage
Females	30	37.5%
Males	50	62.5%
Total	80	100%

Table 3: Distribution according to Age and Gender

Age	Females	Males	Total
1-4 years	5(6.2%)	11(13.8%)	16(20%)
5-8years	8(10%)	14(17.5%)	22(27.5%)
9-12 years	12(15%)	10(12.5%)	22(27.5%)
>12years	5(6.2%)	15(18.8%)	20(25%)
Total	30(37.5%)	50(62.5%)	80(100%)

Table 4: Distribution of participants according to clinical history

Clinical history	Frequency	Percentage
Fever	76	95%
Abdominal pain	34	42.5%
Vomiting's	42	52.5%
Headache	12	15%
myalgia	6	7.5%
Joint pain	3	3.8%
Edema	3	3.8%
Retro orbital pain	1	1.3%
Diarrhoea	5	6.3%
Cold and cough	8	10%

Table 5: Cross tabulation between symptomatology & clinical spectrum

Symptoms	DF	DHF	DLI	DSS	P value
Fever	26(32.5%)	26(32.5%)	13(16.2%)	11(13.8%)	0.2
Abdominal pain	10(12.5%)	10(12.5%)	9(11.2%)	5(6.2%)	0.4
Vomiting	18(22.5%)	12(15%)	7(8.8%)	5(6.2%)	0.3
Headache	3(3.8%)	3(3.8%)	3(3.8%)	3(3.8%)	0.6
Myalgia	3(3.8%)	2(2.5%)	1(1.2%)	0%	0.6
Joint pain	1(1.2%)	0%	2(2.5%)	0%	0.1
Edema	1(1.2%)	1(1.2%)	1(1.2%)	0%	0.8
Retro orbital pain	0%	0%	0%	1(1.2%)	0.1
Diarrhea	1(1.2%)	3(3.8%)	0%	1(1.2%)	0.4

Table6: Distribution of patients according to signs

Signs	Present	Absent
Conjunctival congestion	11(13.8%)	69(86.3%)
Facial puffiness	19(23.8%)	61(76.3%)
Pedal edema	12(15%)	68(85%)
Hepatomegaly	45(56.3%)	35(43.8%)
Splenomegaly	7(8.8%)	73(91.3%)
Ascites	9(11.3%	71(88.8%)

Table 7: Distribution of patients according to signs and clinical spectrum

Signs	DF	DHF	DLI	DSS	P Value
Conjunctival congestion	3(3.7%)	4(5%)	1(1.2%)	3(3.7%)	0.5
Facial puffiness	2(2.5%)	8(10%)	1(1.2%)	8(10%)	0.001
Pedal edema	1(1.2%)	5(6.2%)	1(1.2%)	5(6.2%)	0.01
hepatomegaly	13(16.2%)	20(25%)	5(6.2%)	7(8.8%)	0.03
splenomegaly	..3(3.8%)	3(3.8%)	1(1.2%)	0%	0.6
Ascites	1(1.2%)	5(6.2%)	1(1.2%)	2(2.5%)	0.2

Table8: Distribution of patients according to bleeding tendency

Sites of bleeding	Present	Absent
Rashes	7(8.8%)	73(91.3%)
Maleana	0	100%
Hematuria	3(3.8%)	77(96.3%)
Epistaxis	2(2.5%)	78(97.5%)
Haemetemesis	3(3.8%)	77(96.3%)
Gum bleeding	2(2.5%)	78(97.5%)

Table 9: Distribution of patients according to type of skin rashes

Skin rash	Present	Absent
Flushing	39(48.8%)	41(51.2%)
Macular rash	13(16.3%)	67(83.8%)
Petechae	24(30%)	56(70%)
Echymoses	6(7.5%)	74(92.5%)

Table 10: Distribution according to Torniquet test

Torniquet test	Frequency	Percentage
Positive	33	41.25%
Negative	47	58.75%
Total	80	100%

Table 11: Distribution of patients in relation to HB and clinical spectrum

HB	DF	DHF	DLI	DSS	P Value
<15	22(27.5%)	18(22.5%)	15(18.8%)	10(12.5%)	0.1
>15	5(6.2%)	8(10%)	0%	2(2.5%)	
Total	27(33.8%)	26(32.5%)	15(18.8%)	12(15%)	

Table 12: Distribution of patients according to Pack cell volume (PCV)

PCV	Frequency	Percentage
<45	71	88.8%
>45	9	11.3%
Total	80	100%

Table 13: Distribution of patients according to Total platelet count

Platelet count	Frequency	Percentage
<20000	20	25%
20000-50000	35	43.8%
50000-100000	25	31.3%
>100000	0	0%
Total	80	100%

Table 14: Distribution according to total leucocyte count

Leucocyte count	Frequency	Percentage
<4000	30	37.5%
4000-11000	41	51.3%
>11000	9	11.3%
Total	80	100%

Table 15: Cross tabulation between platelet count and clinical spectrum

Platelet count	DF	DHF	DLI	DSS	Total	P value
<4000	2(2.5%)	11(13.8%)	1(1.2%)	6(7.5%)	20(25%)	0.002
4000-11000	12(15%)	10(12.5%)	7(8.8%)	6(7.5%)	35(43.8%)	
>11000	13(16.2%)	5(6.2%)	7(8.8%)	0%	25(31.2%)	
Total	27(33.8%)	26(32.5%)	15(18.8%)	12(15%)	80(100%)	

Table 16: Distribution of patients according to dengue serology

Dengue serology	Frequency	Percentage
Ig G	22	27.5%
Ig M	52	65%
Antigen	34	42.5%

Table 17: Distribution according to chest X-ray findings

Chest X ray findings	Frequency	Percentage
Normal	55	68.8%
Effusion	25	31.3%
Total	80	100%

Table 18: Distribution in relation to X-ray findings and clinical spectrum

X-Ray	Clinical Spectrum				Total	P value
	DF	DHF	DLI	DSS		
Effusion	4(5%)	11(13.8%)	2(2.5%)	8(10%)	25(31.2%)	0.003
Normal	23(28.7%)	15(18.8%)	13(16.2%)	4(5%)	55(68.8%)	
Total	27(33.8%)	26(32.5%)	15(18.8%)	12(15%)	80(100%)	

Discussion

The study participants consisted of mixed population of males and female with 62.5% and 37.5% respectively and age group from 1 year to about 16 years maximum of 27.75% were between 5-12 years of age and minimum of 20% were among 1-4 years of age-group and the mean age was found to be 8.79±4.35years [7,8]. Among them maximum of 18.8% were males seen in age group of >12years followed by 17.5% males in age group of 4-8years and then followed by 15% were females seen in 8-12years age group and least was 6.2% of females seen in 1-4years of age group that statistically reported P value as 0.2, so it was found that no

correlation in groups [8]. Among these patients' persisting events noted are fever followed by vomiting's, abdominal pain followed headache, myalgia, diarrhoea and joint pains, edema and few percent of retro orbital pain [8,9]. In these patients, fever was the dominant feature in all types of dengue fever. 32.5% people showed fever in both DF and DHF. In DLI 16.2% showed fever and in DSS 13.8% showed fever [9,10,11].

Among all patients, Maximum clinical features presented were hepatomegaly followed by facial puffiness, conjunctival congestion, ascites and splenomegaly. Maximum of patients presented with hepatomegaly in all the types of dengue there was highly significant difference found in facial puffiness and pedal edema with clinical spectrum as P values were found to be 0.001 and 0.01 respectively. When the bleeding conditions are seen it presented with rashes, haemetemesis, hematuria and epistaxis and gum bleeding [11,12]. With respect to skin symptoms in patients were flushing, petechae, macular rash, ecchymosis. Among the participants maximum of 58.75% were negative and only 41.25% were positive on Tourniquet test. Among the participants it was found that as the severity of dengue increased there is decrease in the hemoglobin levels. Participants showed maximum of 88.8% PCV<45 and only 11.3% PCV>45. Among the patient's maximum number of patients (43.8%) were having 20000-50000 platelet count followed by 31.3% between 50000-100000 and only 25% had platelet count <20000 [13,14,15]. Maximum of 43.8% had leucocyte count between4000-11000 of which maximum patients had dengue fever signifies severity with decrease in platelet count and this difference was found to be significant [16,17].

Patients results for presence of maximum Ig M antibodies, antigens and Ig G antibodies. Children aged less than 5 years are prone to dengue infection and have greater risk than adults in developing severe forms of the disease when they acquire a second dengue virus infection with a different serotype. Among 80 children 68.8% that is 55 had normal Chest X-ray and around 31.2% had either right sided or left sided pleural effusion. Among patients with Effusion, maximum was seen in DHF that is 13.8% followed by DSS that is 10% and majority of 68.2% had normal chest x-ray and this difference was found to be significant [16,17,18]. The recent study on dengue focus on importance of age and gender indications to be included in data for proper preventive care by Vector control management.

Conclusion

The performed study shows influence of different clinical manifestations on the severity of dengue fever also it reveals the correlation of the physiological parameters, radiological findings and laboratory test with each other in case of dengue fever. It estimates relevancy of this data to carry out disease diagnosis.

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Conflict of interest: None.

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