

Clinical and Haematological Profile of Patients with Dengue Fever- A Prospective Study

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Abstract

Dengue fever is a mosquito-borne tropical disease caused by the dengue virus. Symptoms typically begin three to fourteen days after infection. This may include a high fever, headache, vomiting, muscle and joint pains, and a characteristic skin rash. Recovery generally takes two to seven days. The present study was conducted in Department of Medicine, Adichunchanagiri Institute of Medical Sciences, from the period of January 2017 to December 2018 to Study of Clinical and Haematological profile of patients with dengue fever. In our study, the incidence of dengue fever common in males compared to females. Majority of patients were in the age group 31-40 years. Out of 100 patients 69(69%) patients were diagnosed to have DF, 24(24%) patients were diagnosed to have DHF and 7(7%) patients were diagnosed to have DSS based on WHO criteria. Fever was present in 100 cases, myalgia in 94 cases, headache was present in 81 cases, joint pains in 90 cases, vomiting in 74 cases, pain abdomen in 69 cases, rash in 52 cases, hepatomegaly in 21 cases, bleeding in 34 cases and shock in 9 cases. As per WHO criteria 71(71%) patients had low platelet counts. Apart from attempts to control the spread of the Aedes mosquito there are ongoing efforts to develop antiviral drugs that would be used to treat attacks of dengue fever and prevent severe complications. Discovery of the structure of the viral proteins may aid the development of effective drugs.

Keywords: Dengue fever, aedesaegypti, clinical and haematological profile.

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INTRODUCTION

Dengue fever is a mosquito-borne tropical disease caused by the dengue virus. Symptoms typically begin three to fourteen days after infection. This may include a high fever, headache, vomiting, muscle and joint pains, and a characteristic skin rash. Recovery generally takes two to seven days. In a small proportion of cases, the disease develops into severe dengue, also known as dengue hemorrhagic fever, resulting in bleeding, low levels of blood platelets and blood plasma leakage, or into dengue shock syndrome, where dangerously low blood pressure occurs [1, 2].

Dengue is spread by several species of female mosquitoes of the *Aedes* type, principally *A. aegypti*. The virus has five types; infection with one type usually gives lifelong immunity to that type, but only short-term immunity to the others. Subsequent infection with a different type increases the risk of severe complications. A number of tests are available to confirm the diagnosis including detecting antibodies to the virus or its RNA [3].

A vaccine for dengue fever has been approved and is commercially available in a number of countries. Other methods of prevention include reducing mosquito habitat and limiting exposure to bites. This may be done by getting rid of or covering standing water and wearing clothing that covers much of the body. Treatment of acute dengue is supportive and includes giving fluid either by mouth or intravenously for mild or moderate disease. For more severe cases, blood transfusion may be required. About half a million people require hospital admission every year. Paracetamol (acetaminophen) is recommended instead of nonsteroidal anti-inflammatory drugs (NSAIDs) for fever reduction and pain relief in dengue due to an increased risk of bleeding from NSAID use [3, 4].

Dengue has become a global problem since the Second World War and is common in more than 110 countries, mainly in Asia and South America. Each year between 50 and 528 million people are infected and approximately 10,000 to 20,000 die. The earliest descriptions of an outbreak date from 1779 [12]. Its viral cause and spread were understood by the early

20th century. Apart from eliminating the mosquitoes, work is ongoing for medication targeted directly at the virus. It is classified as a neglected tropical disease [5].

The diagnosis of dengue is typically made clinically, on the basis of reported symptoms and physical examination; this applies especially in endemic areas. However, early disease can be difficult to differentiate from other viral infections. A probable diagnosis is based on the findings of fever plus two of the following: nausea and vomiting, rash, generalized pains, low white blood cell count, positive tourniquet test, or any warning sign (see table) in someone who lives in an endemic area. Warning signs typically occur before the onset of severe dengue. The tourniquet test, which is particularly useful in settings where no laboratory investigations are readily available, involves the application of a blood pressure cuff at between the diastolic and systolic pressure for five minutes, followed by the counting of any petechial hemorrhages; a higher number makes a diagnosis of dengue more likely with the cut off being more than 10 to 20 per 1 inch² (6.25 cm²) [6].

The diagnosis should be considered in anyone who develops a fever within two weeks of being in the tropics or subtropics. It can be difficult to distinguish dengue fever and chikungunya, a similar viral infection that shares many symptoms and occurs in similar parts of the world to dengue. Often, investigations are performed to exclude other conditions that cause similar symptoms, such as malaria, leptospirosis, viral hemorrhagic fever, typhoid fever, meningococcal disease, measles, and influenza. Zika fever also has similar symptoms as dengue.

The earliest change detectable on laboratory investigations is a low white blood cell count, which may then be followed by low platelets and metabolic acidosis. A moderately elevated level of aminotransferase (AST and ALT) from the liver is commonly associated with low platelets and white blood cells. In severe disease, plasma leakage results

in hemoconcentration (as indicated by a rising hematocrit) and hypoalbuminemia. Pleural effusions or ascites can be detected by physical examination when large, but the demonstration of fluid on ultrasound may assist in the early identification of dengue shock syndrome. The use of ultrasound is limited by lack of availability in many settings. Dengue shock syndrome is present if pulse pressure drops to ≤ 20 mm Hg along with peripheral vascular collapse. Peripheral vascular collapse is determined in children via delayed capillary refill, rapid heart rate, or cold extremities. While warning signs are an important aspect for early detection of potential serious disease, the evidence for any specific clinical or laboratory marker is weak.

OBJECTIVE

Study of Clinical and Hematological profile of patients with dengue fever.

METHODOLOGY

The present study was conducted in Department of Medicine, Adichunchanagiri Institute of Medical Sciences, from the period of January 2017 to December 2018.

STUDY SAMPLE-100 CASES

INCLUSION CRITERIA

- Those admitted with fever more than 38.5°C.
- IgM dengue positive.

EXCLUSION CRITERIA

- Age less than 15 years or more than 60 years.
- Preexisting substantial chronic liver, kidney or heart disease.
- Patients with history of hematological disorders.

RESULTS

The incidence of dengue fever common in males compared to females. Majority of patients were in the age group 31-40 years.

Table-1: Age and Sex Wise Distribution of Cases

Age Group (Years)	Male		Female		Total	
	No.	%	No.	%	No.	%
11-20	14	14	7	7	21	21
21-30	13	13	6	6	19	19
31-40	18	18	11	11	29	29
41-50	11	11	8	8	19	19
>50	06	06	6	6	12	12
Total	62	62	38	38	100	100

Table-2: Clinical Spectrum of Dengue Cases

Diagnosis	Number of cases	Percentage
DF	69	69
DHF	24	24
DSS	07	07
TOTAL	100	100

Out of 100 patients 69(69%) patients were diagnosed to have DF, 24(24%) patients were diagnosed to have DHF and 7(7%) patients were diagnosed to have DSS based on WHO criteria.

Table-3: Distribution of Patients According to Symptoms

Symptoms	Number of cases	Percentage
Fever	100	100
Myalgia	94	94
Jointpain	90	90
Vomiting	74	74
PainABD	69	69
Rash	52	52
Bleeding	34	34
Headache	81	81
Hepatomegaly	21	21
Shock	9	9

In the present study, Fever was present in 100 cases, myalgia in 94 cases, head ache was present in 81 cases, joint pains in 90 cases, vomiting in 74 cases, pain abdomen in 69 cases, rash in 52 cases, hepatomegaly in 21 cases, bleeding in 34 cases and shock in 9 cases.

Table-4: Distribution of Patients According to Platelet Count

Platelet	Number of cases	Percentage
<100,000	71	71
>100,000	29	29
TOTAL	100	100

As per WHO criteria 71 (71%) patients had low platelet counts.

DISCUSSION

In our study, the incidence of dengue fever common in males compared to females. Majority of patients were in the age group 31-40 years. Out of 100 patients 69 (69%) patients were diagnosed to have DF, 24(24%) patients were diagnosed to have DHF and 7 (7%) patients were diagnosed to have DSS based on WHO criteria. Fever was present in 100 cases, myalgia in 94 cases, headache was present in 81 cases, joint pains in 90 cases, vomiting in 74 cases, pain abdomen in 69 cases, rash in 52 cases, hepatomegaly in 21 cases, bleeding in 34 cases and shock in 9 cases. As per WHO criteria 71 (71%) patients had low platelet counts.

Deshwal *et al.*, [7] studied a total of 515 patients of Dengue. In their study too maximum

patients were in 21-40 year age group (62.91%). Vibha *et al.*, [8] studied 100 patients, and observed 49 (49%) to be in the 15 to 25 year age group followed by 33 (33%) cases in the 26 to 35 years age group. Meena *et al.*, [9] (12 did a randomized study of 100 patients with Dengue fever. According to age, maximum cases (29%) were in 21-30 years and rest (27%) were in 15-20 years, (21%) were in 31-40 years, (16%) were in 41-50 years and (7%) in 51- 60 years. Ahmed *et al.*, [10] (n=205) observed the age range for dengue as 10-65 years and the mean age was 31.29 years (SD+13.65).

Deshwal *et al.*, and Vibha *et al.*, too observed a male predominance in their studies with 72.8% and 70% male patients respectively. The male to female ratio was 1.7:1 in Vibha, et al. study. In the study by Ahmed *et al.*, the number of males was 193 (94.15%), while females were 12 (5.85%) with male to female ratio of 9:1 approximately. Meena *et al.*, (n=100) also observed a male predominance with 63 cases (63%) and 37 (37%) female patients.

In the study by Deshwal *et al.*, fever was universal followed by headache (94.75%), myalgia (90.67%), conjunctival injection (39.41%), morbilliform skin rash (37.86%), abdominal pain (24.46%), retro-orbital pain (18.25%), itching predominantly localized to palmar and plantar aspects of hands and feet (13.39%). In the study by Vibha *et al.*, 95 (95%) of the patients had fever as presenting symptom. Other symptoms were myalgia in 70 (70%) cases, arthralgia in 60 (60%) cases and headache in 50 (50%) cases.

Deshwal *et al.*, observed a platelet count of 50,000/cumm at presentation in 69.5% of cases, though it kept on falling further during hospitalization under observation. In their study minimum platelet count noted was 8,000/cumm. In Meena *et al.*, study, (n=100), 90 (90%) cases had thrombocytopenia, in which 61 patients had platelet count between 20,000-60,000. Out of these 61 patients, seven patients (11.47%) had bleeding manifestation. Dongre *et al.*, [11] observed thrombocytopenia, platelet count. Deshwal *et al.*, too reported hepatomegaly in 14.75% and splenomegaly in 13.20% of their cases.

A study conducted by Fu Xi Qiu *et al.*, [12] in which 81% of the patients were among more than 20 years. 70 (70%) patients were male and 30 (30%) were females with a male to female ratio of 2:1. This is due to the fact that males predominantly form the working population & more prone to infection by mosquito bite in a day time. These findings were comparable with a study conducted by Agarwal *et al.*, [13] in which male to female ratio was 1.9:1. A study done by Narayanan *et al.*, [14] in 59 patients, 14 patients had a platelet count less than 50,000cells/cu.mm; 29 patients had platelet count between 50,000-1,00,000 and only 16 patients had platelet count more than one lakh.

CONCLUSION

A National Dengue Day is held in India on May 16th in an effort to raise awareness in affected countries. Efforts are ongoing as of 2019 to make it a global event. Research efforts to prevent and treat dengue include various means of vector control, vaccine development, and antiviral drugs. With regards to vector control, a number of novel methods have been used to reduce mosquito numbers with some success including the placement of the guppy or copepods in standing water to eat the mosquito larvae. There are also trials with genetically modified male *A. aegypti* that after release into the wild mate with females, and render their offspring unable to fly.

Apart from attempts to control the spread of the *Aedes* mosquito there are ongoing efforts to develop antiviral drugs that would be used to treat attacks of dengue fever and prevent severe complications. Discovery of the structure of the viral proteins may aid the development of effective drugs. There are several plausible targets. The first approach is inhibition of the viral RNA-dependent RNA polymerase (coded by NS5), which copies the viral genetic material, with nucleoside analogs. Secondly, it may be possible to develop specific inhibitors of the viral protease (coded by NS3), which splices viral proteins. Finally, it may be possible to develop entry inhibitors, which stop the virus entering cells, or inhibitors of the 5' capping process, which is required for viral replication.

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