Original Article

Clinical and haematological parameter in adult dengue patients

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Abstract

Aim and Objective: The objective of this study to compare clinical findings in dengue fever and correlate laboratory tests during dengue illness and to assess the severity of illness using different haematological parameter. **Methods:** This is an observational, retrospective study of 60 patients with clinical and serological diagnosis of dengue fever visited or admitted in Yenepoya Medical College during December 2014 to December 2015. The tests analyzed were Haemoglobin, platelet count, Total bilirubin, serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) concentrations. **Results:** Most important clinical symptoms are fever and myalgia observed in almost all cases of dengue (98.8%) Thrombocytopenia, leukopenia and elevated liver enzymes were observed in patients with classic dengue fever. The main laboratory abnormalities found in dengue hemorrhagic fever were thrombocytopenia, leucopenia, hemoconcentration and elevated liver enzymes. **Conclusion:** Most of the complication in Dengue are preventable with appropriate and timely medical intervention. Majority of cases in our study had thrombocytopenia and leucopenia. These indicators if early assessed can be of value of better care of dengue patient and prevent its complications.

Key Words: Dengue Hemorrhagic Fever, Leucopenia, Thrombocytopenia, serum aspartate aminotransferase, serum alanine amino transferase.

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INTRODUCTION

Dengue fever is commonest cause of arboviral infection in humans. In India incidence of dengue fever is increased dramatically[1,2,7,9]. Dengue is caused by one of the four serotypes of the dengue virus (DEN-1, DEN-2, DEN-3 and DEN-4) also referred to as an arbovirus (arthropod-borne viruses) that belongs to the genus Flavivirus of the family Flaviviridae. Dengue has got wide variety of presentation ranging frm classical dengue fever, dengue haemorragic fever and dengue haemorragic syndrome. If recognized early and managed properly complication of dengue can be prevented[7,9]. Transmission to humans occurs by the bite of the female Aedes aegypti mosquito infected by one of four serotypes of the virus.. The period of transmission from humans to mosquitoes begins one day before the start of fever up to the sixth day of illness corresponding to the viremia phase. In humans, the incubation period ranges from 3 to 15 days (intrinsic incubation) with an average of 5 days. The diagnosis of dengue fever is carried out based on clinical, epidemiological and laboratory data[1,2,3,]. Thrombocytopenia and Leucopenia are the most prominent hematological change in dengue patient. However, there are reports of mild leukocytosis at the onset of the disease, with neutrophilia. Lymphocytosis is a common finding, with the presence of atypical lymphocytes. Other changes in biochemical profile are in liver function tests such as in serum aspartate aminotransferase (AST), serum alanine aminotransferase (ALT) and alkaline phosphatase levels, and serum albumin concentrations[11,12]. Early diagnosis of dengue is important for specific care which is important for marked

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reduction in the morbidity of the disease. The present study aimed to assess the Clinical, biochemical and hematological dynamics of patients with dengue fever in order to increase the sensitivity of the screening by healthcare professionals in the most serious cases and to try to identify laboratory markers that may help the physician in better management of the patient[11,12,13]

MATERIALS AND METHODS

Sixty clinically and serologically diagnosed cases of dengue were studied retrospectively. The patients were admitted in yenepoya medical college in the period of December 2014 to December 2015

Inclusion Criteria

Patients age between 18 to 60 who were clinically and serologically diagnosed to be dengue are included in the study.

Exclusion Criteria

All other febrile illness except dengue, haematological disorders and malignancies, liver failure, peptic ulcer, chronic splenomegaly syndrome and auto immune disorders. This is an observational, descriptive and retrospective study of 60 patients with clinical and serological diagnoses of dengue fever. The tests analyzed were complete blood count, and Liver function test. Case definition criteria for dengue fever were high fever, fever with rash, retro orbital pain, myalgia, arthralgia, and conjunctival congestion. The criteria for dengue hemorrhagic fever included a triad of hemorrhagic manifestations, moderate to severe thrombocytopenia and clinical signs of plasma leakage. Leucopenia was defined as total WBC count less than 4000/cumm and thrombocytopenia as less than 1.5 lakh/cumm. Haemoconcentration is defined as raised RBC and Haemoglobin. Liver function tests were done on fully automated analyzer.

RESULTS

Out of 60 cases seropositive for dengue 42 (70%) were positive for NS1, 15 (25 %) for IgM and 3 (5%) for IgG. Out of 60 patients 10 were females and 50 were males. Majority of patient are in age limit of 20 to 30.Most of the patient are construction workers. The clinical, hematological and biochemical features observed are as in Tables 1 to 7.

Table 1: Clinical features in Dengue fever

	NS1 (42 patients)	IgM (15 patients)	IgG N= 3
High Grade Fever	42(100%)	15 (100%)	02 (66.6%)
Myalgia	42(100 %)	15(100%)	02 (66.6 %)
Skin rash	21(50%)	7(46.60%)	nil
Arthalgia	20 (47.61 %)	6 (40 %)	01 (33.3 %)
Conjuctival congestion	21 (50 %)	7 (46.66)	01 (33.33 %)
Hepatomegaly	20 (47.61 %)	9 (60 %)	02 (66.66%)
Spleenomegaly	21 (50 %)	8(53.33%)	01 (33.33 %)
Vomiting	20 (47.61%)	06 (40%)	00 (00 %)
Headache	28 (66.66 %)	73.33 (80 %)	2(66.66 %)
Retroorbital pain	30(71.42)	08 (53.33 %)	Nil

Table 2: Haemoglobin in Dengue fever

Haemoglobin	NS1 42 patients	IgM 15 patients	IgG 3 patients
7.0 -11.0	8 (19.04 %)	4 (26.66)	Nil
11.0 -13.0	30 (71.42 %)	07 (46.66 %)	03(100 %)
13.0 -16.0	4 (9.57%)	4(26.66 %)	Nil

Table 3: Total leucocyte count in Dengue Fever

Total Leucocyte count	NS1 42 patients	IgM 15 patients	IgG 3 patients
7000- 10000	02 (7.4 %)	2(13.33%)	00 (00 %)
4000 – 7000	4 (25.9 %)	06 (40 %)	02 (66.66 %)
Less than 4000	36 (66.6 %)	11 (73.33%)	01(33.33 %)

Table 4: Platelet count in Dengue Fever

Platelet count	NS1 42 patients	IgM 15 patients	IgG 3 patients
More than 150000	3(7.14%)	2(13.33%)	01 (33.33 %)
100000 -150000	6 (14.28%)	6(40 %)	01 (33.33 %)
10000 -100000	33 (78.57%)	7(46.66%)	01 (33.33 %)

Table 5: SGOT levels in Dengue fever

	NS1 42 PATIENTS	IgM 15 PATIENTS	IgG 3 PATIENTS
AST (SGOT Increased)	35 (83.33%)	10(66.66%)	02 (66.66 %)
AST(SGOT Normal)	07(16.66%)	05 (33.33%)	01 (33.33 %)

Table 6: SGPT Levels in Dengue Fever

	NS1 42 PATIENTS	IgM 15 PATIENTS	IgG 3 PATIENTS
ALT (SGPT) increased	32 (80.95%)	8(53.33)	02(66.66%)
ALT (SGPT)normal	8 (19.04%)	07 (46.66%)	01 (33.33%)

Table 7: Bilirubin levels in dengue fever

	NS1 42 PATIENTS	IgM 15 PATIENTS	IgG 3 PATIENTS
Increased Bilirubin	12(28.57%)	4 (26.66%)	00 (00 %)
Normal Bilirubin	30 (71.42 %)	11 (73.33%)	03 (100 %)

Majority of patient had symptoms like fever, arthralgia, myalgia, headache and vomiting. patient also had skin

rash, conjuctival comgestion, hepatosplenomegaly etc. Thrombocytopenia, leucopenia and features of hemocentration were important haematological parameters of serological positive dengue cases. liver enzymes were elevated in majority of patients.

DISCUSSION

Dengue fever if not diagnosed early can lead to complications which can be fatal. Aim of our study to analyze clinical and blood parameters in order to try to identify biomarkers that are predictive of severity of illness. The presentation of dengue are in three forms, classical dengue fever, dengue haemorragic syndrome and dengue shock syndrome. Increase in dengue cases over the past few years may be due to poor sanitation facilities contributing breeding areas for mosquitoes, unplanned urbanizations etc.[11,12,13] The severity of disease depend upon strain and serotype of virus, age of the patient and associated comorbid conditions. Majority of patients in our study are males who are construction workers. The most common clinical feature of dengue in our study was high grade fever and myalgia. Retro orbital pain, head ache, arthralgia and vomiting are seen in majority of patients. Munde *et al*[11] in their series of patient have shown myalgia in 50% of cases and head ache in 25% of patients. The rash associated with fever was typically macular or maculopapular. The rash was not associated with scaling or pruritus. Pervin[15] *et al*, reported occurrence of rash in 33% of patients. Hepatomegaly was observed in more than 50% of our patients... Pervin *et al*, reported myalgia in 84.5% of patients. Hemoconcentration was seen in majority of the patients patients[11,15]. Thrombocytopenia (platelets < 1,50,000/cmm) was seen in majority of patients. The platelet count in the patients of ranged between 10,000-3,00,000/cmm. 8 patients received platelet transfusion in view of low platelet count(less than 20000/cmm). Our study had majority of patients with classical dengue fever. Leucopenia was observed in 26% of patients by Ratagiri *et al*[14]. Leucopenia was observed in more than 50% of patients in our study. Development of antibodies potentially cross-reactive to plasminogen (due to a similarity in 20 amino acid sequence of dengue E glycoprotein and a family of clotting factors) could have a role in causing haemorrhage in DHF. The increased destruction or decreased production of platelets could result in thrombocytopenia.. The release of high levels of platelet-activating factor by monocytes with heterologous secondary infection may explain the haemorrhage, given that platelet-activating factor may induce platelet consumption and augment adhesiveness of vascular endothelial cells resulting in thrombocytopenia.. Cross reactions with other flaviviruses interfere with serologic testing, particularly the ELISA for IgG and this affects the interpretation of test results in travellers exposed to other flavivirus infections, including those previously vaccinated against flavivirus infections, such as yellow fever and Japanese encephalitis[4,5]. Primary infections are characterised by an increase in dengue-specific NS1 antigen and IgM antibodies four to five days after the onset of fever and by an increase in IgG antibodies only after seven to ten days. IgM antibodies are detectable for three to six months, whereas IgG antibodies remain detectable for life. In secondary infections, the level of IgM antibodies is lower than in primary infections and the antibodies are sometimes absent, whereas levels of 1gG antibodies rise rapidly in secondary infections, even during the acute phase. Thus, the presence of high titers of 1gG early in the course of the disease is a criterion for secondary infection[4,7]. Our study shows that DSS is an uncommon manifestation of dengue virus infection. Dengue infection is generally self limiting. Patients with bleeding manifestations usually have decreased platelet count and leucocyte count. Hemoconcentration, leucopenia, thrombocytopenia, raised AST, raised ALT and plasmacytoid lymphocytes in peripheral blood smear shall give enough clue to test for Dengue serology so as to reduce the morbidity and mortality due to this disease[1,2,12,13]. According to World Health Organization (WHO), PCR is a powerful method to be used for dengue diagnosis, but PCR is not widely available and it still needs to be better standardized. Early diagnosis by clinical and haematological parameter prevents mortality due to dengue complications[1,2,3,6,7]

CONCLUSION

Most of the complication in Dengue are preventable with appropriate and timely medical intervention. The results of this study have highlighted the importance of history, clinical examination and the triad of thrombocytopenia, raised hematocrit and elevated liver enzymes for the early diagnosis of Dengue fever without waiting for dengue serology for diagnosis. Therefore, it is recommended that the diagnosis of dengue fever should be made early on the basis of clinical symptoms and basic investigations. Early diagnosis, careful monitoring and proper management reduce mortality associated with dengue fever.

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