



A STUDY ON EVALUATION OF HAEMATOLOGICAL PROFILE IN DENGUE FEVER

Pathology

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ABSTRACT

Background: Dengue fever is caused by dengue virus which is a mosquito borne pathogen and this disease is now endemic in India. This infection produces varied haematological changes in the patient which can at times be life threatening. The aim of this study was to identify these changes in serologically confirmed dengue cases.

Methods: 50 cases diagnosed as dengue based on NS1 antigen were analysed for haematological parameters which included haematocrit value, total leucocyte count, differential leucocyte count, platelet count and peripheral blood smear.

Results: Common haematological abnormalities detected were leucopenia, raised haematocrit, thrombocytopenia and presence of activated lymphocytes.

Conclusion: Hematological parameters play a key role in early diagnosis of dengue infection. Monitoring these parameters aids in effective management of patients and prevention of complications.

KEYWORDS

INTRODUCTION

Dengue is caused by an arbovirus –dengue virus. There are four serotypes of dengue virus (DEN-1, DEN-2, DEN-3, DEN-4).^[1] All the four serotypes are closely related but antigenically distinct. The disease has a varied presentation ranging from being asymptomatic to presenting with fever to life threatening forms like dengue hemorrhagic fever and dengue shock syndrome.^[2,3] Over the last few years the incidence of dengue has increased markedly and is now a major public health concern and an endemic disease in India especially in North India.^[1] The diagnosis of Dengue infection is based upon specific microbiological, serological and molecular tests.^[4] A wide range of haematological abnormalities are reported in dengue like thrombocytopenia, leucopenia, raised haematocrit, lymphocytosis with presence of atypical lymphocytes.^[5,6] The aim of this study was to study the haematological abnormalities in dengue so that these parameters can be used to suspect and identify patients at an early stage and also predict the prognosis of the patients.

MATERIALS AND METHODS

This study included clinically suspected 50 cases of dengue who were further confirmed by dengue specific NS1 antigen. Both adult and pediatric patients were included in the study. Patients who were serologically positive for dengue but positive for other coexistent infections like malaria, typhoid were excluded. Those with pre-existing haematological disorders were also excluded. Serological test was done by collecting venous blood sample from patients presenting with symptoms suggestive of dengue. Complete hemogram was done by obtaining 2ml venous samples collected in EDTA vacutainer. Hemoglobin, haematocrit, total leucocyte count and platelet count were analysed using an automated analyser.

RESULTS

50 patients diagnosed with dengue based on NS1 positivity were included in the study and their complete hemogram was done. 26 patients (52%) were females and 24 patients (48%) were males. 6 patients (12%) were in the age group of 1-10 years, 15 patients (30%) were in the age group of 11-20 years, 10 patients (20%) were in the age group of 21-30 years, 10 patients (20%) were in the age group of 31-40 years, 5 patients (10%) were in the age group of 41-50 years, 3 patients (6%) were in the age group of 51-60 years, 1 patient (2%) was in the age group of 61-70 years. (Table 1)

19 patients (38%) had a haematocrit of more than 40%. (Table 2) 26 patients (52%) had leucopenia and only one patient (2%) had leucocytosis. (Table 3) 1 patient (2%) had platelet count of less than 20,000/cumm, 3 patients (6%) had platelet count in the range of

20,000-50,000/cumm and 1 patient (2%) had platelet count in the range of 50,000-1,00,000/cumm. 19 patients (38%) had platelet count between 1,00,000-1,50,000/cumm and 25 patients (50%) had platelet count more than 1,50,000/cumm. (Table 4) Activated lymphocytes were seen in 17 patients (34%).

DISCUSSION:

In the present study of the 50 cases majority (30%) were in the age group of 11-20 years followed by 20% patients each in age groups of 21-30 years and 31-40 years. About 40% of patients were adults in age group of 21-40 years. This finding was comparable to a study by Gitika et al and Tahlan et al where majority of patients were in the age group of 21-40 years.^[3,1] In our study the haematocrit was raised (>40%) in 19 (38%) patients. Gajera et al in their study had raised haematocrit in 28% of patients which was slightly lower than our finding.^[4] In dengue fever some patients may go to dengue shock syndrome where the acute increase in vascular permeability leads to exudation of plasma into the extravascular compartments causing hemoconcentration. This results in increased haematocrit.^[7]

Leucopenia was the most prominent haematological feature seen in 26 (52%) patients. Tehlan et al in their study observed leucopenia in 34.78% cases.^[1] Thrombocytopenia (platelet count below 1 lakh) was seen in 5 (10%) patients. This was in contrary to the study by Gitika et al where thrombocytopenia (platelet count below 1 lakh/cumm) was seen in 54% cases.^[3] In our study mild thrombocytopenia (platelet count between 50,000-1,00,000/cumm) was seen in 1 case (2%), moderate thrombocytopenia (platelet count between 20,000-50,000/cumm) was seen in 3 cases (6%) and severe thrombocytopenia (platelet count <20,000) was seen in only 1 case (2%). Gitika et al in their study observed mild thrombocytopenia in 38% cases, moderate thrombocytopenia in 14% cases and severe thrombocytopenia in 25 cases. This discrepancy may be because of more number of patients of early dengue in our study. Various mechanisms have been proposed for reduced platelet count, like immune mediated damage to platelets, bone marrow suppression, virus mediated injury to platelets or disseminated intravascular coagulation.^[4,6,8]

Total leucocyte count in our study ranged from 1800/cumm to 19,700/cumm. Leucopenia (WBC count <4000) was seen in 26 cases (52%). Normal leucocyte count was seen in 23 cases (46%). Leucocytosis (WBC count >11,000) was seen in 1 case (2%). Gajera et al in their study had leucopenia (WBC count <4000) in 43% cases and leucocytosis (WBC count >16,000) in 9% cases.

Many of the studies on dengue have reported leucopenia. Peripheral

smear examination revealed activated lymphocytes in 17(34%) cases, Chowdhary et al observed presence of reactive lymphocytes in 18% cases.^[8] Presence of reactive lymphocytes indicated an exaggerated immune response against dengue virus.^[4,9,10]

CONCLUSION

Dengue infection has become endemic in many states over the last few years. Complication of dengue viral infection like dengue hemorrhagic fever and shock syndrome can be life threatening. Some of the prominent haematological findings observed in dengue infection like raised haematocrit, leucopenia, presence of activated lymphocytes and thrombocytopenia can be used as markers for early diagnosis of this infection and hence prevent the progression to severe disease. These parameters aid greatly in also monitoring of patients as dengue fever has no specific medical therapy and recovery is mainly based on monitoring of these parameters.

Table 1 : Distribution of patients according to age and sex(n=50)

Age(years)	Male	Female	Total	Percentage (%)
0-10	01	05	06	12
11-20	09	06	15	30
21-30	04	06	10	20
31-40	06	04	10	20
41-50	01	04	05	10
51-60	02	01	03	06
61-70	01	00	01	01
Total	24	26	50	100

Table 2:Hematocrit value of the patients

Hematocrit(%)	Number of patients	Percentage(%)
>40	19	38
<40	31	62
Total	50	100

Table 3:Leucocyte count in dengue patients

Leucocyte count(/cumm)	Male	Female	Total	Percentage
<4000	12	14	26	52
4000-11000	12	11	23	46
>11000	00	01	01	02
Total	24	26	50	100

Table 4: Platelet count in Dengue patients

Platelet count(/cumm)	Number of patients	Percentage(%)
<20,000	01	2
20000-50000	03	6
50000-1,00,000	01	2
1,00,000-1,50,000	19	38
>1,50,000	26	52
Total	50	100

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