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STUDY OF HAEMATOLOGICAL PROFILE IN DENGUE SEROPOSITIVE PATIENTS.

Laboratory Medicine

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ABSTRACT

Background: Dengue is a major preventable and treatable cause of morbidity and mortality among children and adults that occurs mainly in tropical and subtropical regions. Early diagnosis of dengue is important for provision of specific care which ensures marked reduction in the morbidity of the disease itself. Prognosis of Dengue cases are well monitored using Hematological parameters.

Aims and Objectives:

1. To study the haematological profile of dengue seropositive cases.
2. To compare the haematological changes among patients positive for various combinations of Dengue NS1, IgM and IgG seropositive cases.

Materials And Methods: 500 blood samples of dengue seropositive Dengue NS1, IgM or IgG patients were collected and Hematological parameters were assessed using automated hematology analyser. **Results:** The serology pattern showed NS1 predominance followed by IgG. Total of 27.2% of the cases showed increased hematocrit, 47.2 % cases showed thrombocytopenia, 34.6% leucopenia, 6.2% leucocytosis, 11% Neutrophilia,16.4% lymphocytosis and 13% cases showed low hemoglobin levels. **Conclusion:** Dengue epidemics strain the limited resources of the public health system. This study explores the utility of simple, easy, rapid & cost-effective tests like serology & hematology, also as a supplement & substitute to one other in diagnosis & prognosis of the dengue spectrum especially in rural & peripheral areas. These indicators, if rightly and timely assessed can be of value for better care of complicated cases

KEYWORDS

Thrombocytopenia, Dengue, leucopoenia, seropositive.

INTRODUCTION

Dengue fever is a mosquito borne acute viral illness transmitted by Aedes aegypti and Aedes albopictus in tropical and subtropical regions around the world. The spectrum of Dengue infection may range from asymptomatic infection to Dengue fever and Dengue Hemorrhagic fever

Diagnosis of Dengue infection can be done by virus cultivation, molecular methods like Polymerase Chain Reaction and by the detection of virus specific Nonstructural protein 1 (NS1) antigen, IgM and IgG antibodies using Enzyme Immunoassay or immunochromatography (1). Immunochromatographic tests used for the detection of Dengue are simple and rapid, and make point of care testing possible. Hence immunochromatography remains the most common test used for the diagnosis of Dengue infection in resource poor settings.

Hematology parameters in dengue includes Hemoconcentration, leucopenia, thrombocytopenia, and reactive 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.

MATERIAL AND METHODS:

500 blood samples of dengue seropositive patients were collected and Hematological parameters were assessed. The present study was conducted in the Pathology and Microbiology departments in a tertiary care Hospital, for a period of 6 months.

Data collection: All serum samples showing positive for Dengue NS1, IgM or IgG were included in the study. Serum samples submitted to the Microbiology department for Dengue serology will be tested by SD Biosensor Dengue Ag+Ab Duo Kit. Samples which are Dengue seropositive were identified and their hematological parameters like hemoglobin (Hb), the total and the differential leucocyte counts (TLC and DLC), platelet count, hematocrit (Hct) were performed on the fully automated hematology analyzer with a three-part differentia

Inclusion Criteria:

All serum samples showing positive for Dengue NS1, IgM or IgG will be included in the study

Exclusion Criteria:

Patients with serologically negative dengue and other co infections like malaria, Typhoid with positive Dengue Ig M/ IgG were excluded from the study

Statistical Analysis:

Statistical analysis will be done by calculating P value using chi-square test.

AIMS AND OBJECTIVES

1. To identify Dengue seropositive cases.
2. To evaluate the hematological profile of these cases.
3. To compare the hematological changes among patients positive for various combinations of Dengue seropopsitivity NS1, IgM and IgG.

RESULTS

Table 1: Showing age wise distribution of dengue seropositive male and female patients

Age (in years)	Number of cases	Total number of Males	Total number of Females
1-10	28	18	10
11-20	70	43	27
21-30	107	69	38
31-40	116	73	43
41-50	75	47	28
51-60	61	40	21
61-70	32	19	13
>70	11	07	04
Total	500(100%)	316(63.2%)	184(36.8%)

A total of 500 dengue serology positive cases were analysed. The age range was between 1 Year to more than 70 years with most cases in the 31-40 years group. There was a male predominance with male: female ratio of 1.9:1.

Table 2: Showing age wise distribution of various combinations of Dengue seropositive cases

Age (in years)	NS1 + antigen	NS1& IgM+	NS1& IgG +	NS1, IgM & IgG+	IgM+	IgM & IgG +	IgG +
1-10	08	3	02	02	4	06	05
11-20	11	14	02	05	12	12	10
21-30	36	11	10	03	16	14	12
31-40	53	09	07	04	09	10	27

41-50	24	08	02	04	13	05	22
51-60	12	02	03	01	8	09	26
61-70	09	0	00	03	12	02	06
>70	07	0	00	01	2	00	02
Total	160(32%)	47(9.4%)	26(5.2%)	23(1.8%)	76(15.2%)	58(11.6%)	110(24.8%)

Out of 500 samples, 160(32%) were positive for the NS1 antigen, 47(9.4%) were positive for NS1and IgM+, 26(5.2%) cases were NS1& IgG +, 23(1.8%) cases of NS1, IgM & IgG+, 76(15.2%) cases of IgM+, 58(11.6%) cases of IgM & IgG + and 110(24.8%) cases of IgG +.

Table 3: Hematological parameters of various combinations of Dengue seropositive cases

Hematology parameters	NS1 + antigen	Ns1 & IgM+	Ns1 & IgG +	Ns1, IgM & IgG+	IgM +	IgM & IgG +	IgG +	Percentage
Low hemoglobin	08	1	04	05	12	09	26	13%
Raised hematocrit	43	13	07	15	6	13	39	27.2%
leucocytosis	01	01	02	01	8	08	10	6.2%
Neutrophilia	08	04	04	06	09	09	15	11%
Lymphocytosis	01	12	01	01	23	13	31	16.4%
Leucopenia	72	10	07	12	16	21	35	34.6%
Thrombocytopenia	48	27	09	18	48	34	52	47.2 %

The serology pattern showed NS1 predominance followed by IgG. Total of 27.2% of the cases showed increased hematocrit, 47.2 % cases showed thrombocytopenia, 34.6% leucopenia, 6.2% leucocytosis, 11% Neutrophilia,16.4% lymphocytosis and 13% cases showed low hemoglobin levels.

Leucopenia and thrombocytopenia along with increased hematocrit are the major hematological parameters altered in dengue seropositive cases.

DISCUSSION

NS1 antigen is a highly conserved glycoprotein in all Dengue serotypes, which is a very useful tool in the early diagnosis of Dengue infection as it is present in high concentrations in dengue infected patients between the first and the nineth day of onset of fever (2). NS1 antigen is expressed in the infected cells in membrane-associated (mNS1) and secreted (sNS1) forms (3). Sensitivity of detection of NS1 in primary dengue infection is more than 90% and in secondary infection the sensitivity is about 60-80%. The lower sensitivity in secondary infection is due to an anamnestic response to the earlier dengue virus infection (4).

In addition, raised levels of NS1 antigen and high levels of early viraemia have been associated with higher risk of developing grave clinical presentations like Dengue Hemorrhagic fever (4,5). NS1 antigen has been shown to trigger endothelial cell permeability and cause vascular leak (6). Studies have shown a higher association with thrombocytopenia and NS1 positivity and this association is stronger when specific IgM antibodies are also detected along with the NS1 antigen (7).

Specific antibodies against Dengue appear after the 5th day in primary infection and around the third day in secondary infection (7). Specific IgM antibodies can persist up to 2-3 months after infection (8).

Detection of only specific IgG antibodies in a Dengue patient is considered as a less reliable marker as it can be raised both in clinical and subclinical infections and persists for several years after infection (7). On the other hand, high levels of specific IgG antibodies can be detected and IgM antibodies may be absent in some cases of secondary infection (9,10).

Our present study showed raised Hematocrit due to hemoconcentration, Leukopenia is a well-established feature of dengue which is due to direct marrow suppression by the dengue virus, Thrombocytopenia in dengue is caused by bone marrow suppression & immune mediated clearance of platelets

Meena KC et.al studied hematological profile of 100 cases of IgM positive dengue and depicted that a greater number of cases were in the age group of 21-30 year (29%). Maximum number of cases (90%) showed thrombocytopenia, Leucopenia was seen in 51% patients and >45% hematocrit was seen in 13% patients[12]

In our study majority of the patients exhibited NS1 antigen positive in comparison to IgM and IgG antibodies then similar to study done by Mohamed MK et.al[13]

Tahlan et al studied 46 cases of dengue positive cases and described that the most common hematological abnormalities were thrombocytopenia and leukopenia. 10 case showed platelet count below than <20,000/cumm and was seen majorly in 20-30 age group. Lymphocytosis was a frequent hematological finding in all forms while the disease which persisted till the time of discharge from the hospital. [14]

CONCLUSION:

Complete Blood count (CBC) is an important part of the diagnostic workup in dengue seropositive patients. Thrombocytopenia serves as predictive marker to promote the early diagnosis of dengue infection. Leukopenia is a well-established feature of dengue which is due to direct marrow suppression by the dengue virus Prognosis of Dengue cases are well monitored using Hematological parameters. These indicators, if rightly and timely assessed can be of value for better care of complicated cases

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