FREQUENCY OF BICYTOPENIA (LEUCOPENIA AND THROMBOCYTOPENIA) IN DENGUE PATIENTS

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ABSTRACT

Objective: To determine the frequency of bicytopenia (Leucopenia and Thrombocytopenia) in dengue patients who presented to the medicine department Hayatabad Medical Complex.

Study Design: Cross Sectional Study

Place and Duration of Study: This study was conducted in Department of Medicine, Hayat Abad medical complex Peshawar, from 1st Sep 2017 to 30th Sep 2017.

Materials and Methods: 152 patients who were diagnosed with dengue fever on Dengue NS1serology positive were included in the study. Sampling technique used was Non probability consecutive sampling. Frequency of bicytopenia in terms of low white blood cell count in terms of absolute neutrophil count and low platelet count was determined by taking 1800 /cmm as the cut off for ANC and 150,000/cmm as the cut off for platelet count. Data was formulated using SPSS 23. Results were expressed as percentages. Mean and Standard deviation were taken where required.

Results: In this study males were 69% and females were 31%. The male to female ratio was 2.23: 1. Bicytopenia was found among 45 patients with dengue. Out of these 35 were males and 10 were female patients Bicytopenia was more common in extreme of ages i.e younger age and elder patients.

Conclusion: Bicytopenia is a common problem in clinical and haematological practice. The incidence is high in dengue patients. Therefore prompt action is required when patients presenting with dengue develop bicytopenia so that one can be treated to reduce morbidity and prolong survival.

Key Words: Dengue, peripheral Smear bicytopenia, platelet count. Absolute neutrophil count, white blood cell count

INTRODUCTION

There is clear evidence that the world's climate is changing and that global warming is a real phenomenon. There has been much interest in the impact this change will have on the distribution of diseases, particularly vector-borne diseases. Projections for the future spread of dengue using conservative predictions of changes in humidity and population suggest that 4.1 billion people (44% of world's population) will be at risk of dengue by 2055.[1] World Health Organization (WHO) estimates that 50-100 million Dengue infections occur every year with 22000 deaths. [2]It has been identified as one of the 17 neglected tropical diseases by WHO.[3] The emergence and spread of all four dengue viruses ("serotypes") represent a global pandemic.

The epidemiology of dengue is an intricate phenomenon which depends upon a complex relationship between epidemiological factors viz., host (man and mosquito), agent (virus) and the environment (biotic and biotic factors).[4] The causative agent dengue virus belongs to genus Flavivirus of the family Flaviviridae. Dengue virus is a positive-stranded encapsulated RNA virus. The dengue virus genome is composed of three structural protein genes encoding the nucleocapsid of core protein (C), a membrane associated protein (M), an envelope protein (E) and seven non-structural (NS) proteins- NS1, NS2A, NS2B, NS3, NS4A, NS4B and NS5.[4] Dengue fever and dengue haemorrhagic fever are caused by four antigenically related dengue viruses 1, 2, 3 and 4.[6] All four viruses have Aedes Aegypti as their principal vector.[5] The complexity of relationship amongst these factors eventually determines the level of endemicity in an area. During interepidemic period, the transmission of dengue remains low due to extremes of temperature with low relative humidity but during monsoon the environment becomes suitable for vectors, temperature between 25º C and 30º C relative humidity around 80% and innumerable small water collections resulting in high vector density.[4]

All four serotypes have long been endemic in Asia. Co-circulation of several serotypes of dengue virus has resulted in concurrent infection in some patients with multiple serotypes of DV.[7] Infection with any one serotype confers lifelong immunity to that virus serotype.[6] The four dengue virus serotypes can co-circulate in the endemic area because the immunity to one serotype does not protect from the infection by a heterotopous serotype.[4]

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Classic dengue fever (break bone fever) is an acute self-limited illness with diphasic fever, headache, arthralgia, myalgia, rash, lymphadenopathy and leukopenia caused by four distinct serotypes of dengue virus, a mosquito-borne Flavivirus. DHF is distinguished from classic dengue by haemorrhagic manifestations, thrombocytopenia with concurrent hemoconcentration and in severe cases, circulatory failure, shock(dengue shock syndrome), and death in a proportion of cases.[7] The induction of vascular permeability and shock depends on multiple factors such as presence or absence of enhancing and non-neutralizing antibodies, age (susceptibility to severe dengue drops considerably after 12 years of age), sex (females are more often affected than males), race (whites are more often affected than blacks), nutritional status (malnutrition is protective), or sequence of infections (e.g. dengue virus 1 infection followed by dengue virus 2 infection seems to be more dangerous than dengue virus 4 followed by dengue virus 2 infection). [5]

An outbreak of DF was encountered in Karachi in 1994 and another at upper parts of Punjab in 2003, in addition to sporadic cases in Rawalpindi, Mangla, Peshawar, Abbottabad and Haripur.[9, 10]

The key to control of both dengue and severe dengue is the control of A. aegypti. Control effects have been handicapped by the presence of non-degradable tires and long-lived plastic containers in trash repositories (perfect breeding grounds when filled with water during rainfall) and by insecticide resistance.[5] Although the true impact of dengue is difficult to measure owing to inadequate disease surveillance, lack of diagnostic facilities and poor reporting; the burden of dengue is expected to further rise due to globalization, increase in travel and trade, global warming and lack of vaccine and specific antiviral therapy.[8]

OPERATIONAL DEFINITIONS

Dengue Patients

All those patients who were Dengue NS1 serology positive confirmed by haematologist were included in the study.

Bicytopenia

Leucopenia:

Leucopenia-taken as absolute neutrophil count (ANC) is defined as neutrophil count less than 1800 cells per microliter.[11] This absolute count was calculated from peripheral smear using haemocytometer in the hospital laboratory.

Thrombocytopenia:

Platelets cells count less than 150,000 cells per microliter is taken as thrombocytopenia.[11]

MATERIALS AND METHODS

This Cross-Sectional Study was conducted at department of medicine Hayat Abad Medical complex Peshawar from 1st Sep 2017 till 30th Sep 2017 after taking permission from local ethical and research committee. A total of 152 patients were observed and consecutive, non-probability, sampling technique was used for sample collection.

SAMPLE SELECTION

INCLUSION CRITERIA

1. Aged 15-75 years
2. Dengue NS1 positive serology

EXCLUSION CRITERIA

1. Extremes of ages (Less than 15 years and above 75)
2. Dengue NS1 negative
3. Any other bleeding disorder
4. Any known oncological or haematological disorder
5. Co-existent slide positive malaria

Data Collection Procedure

The study was carried out at Medicine department, Hayatabad Medical Complex, Peshawar. Approval was taken from Medical Ethics Committee before playing out the study. Patients were chosen for the research after cautious assessment of their health in accordance with the inclusion criteria. The purpose and benefits of the study were disclosed to the patients and composed informed consent was acquired from every patient. All patients meeting the inclusion criteria were incorporated into the study. An information accumulation close-ended questionnaire (annexure-1) was filled for every patient having a detailed record of the ailment including medical record number, age and gender. Applicable brief general and fundamental examination was done. Patients were evaluated for any complications fulfilling exclusion criteria. Consecutive cases that satisfy inclusion and exclusion criteria were included.

DATA ANALYSIS

Data was analysed using SPSS latest version 23.0.0.0 and the p value of 0.05 was taken as significant, with confidence interval of 95%. Quantitative variables were described in terms of mean ± standard deviation. Categorical data was described in terms of frequencies and percentages. Bicytopenia was stratified among age and gender to see effect modification. The data was analysed and discussed according to the operational definitions and then compared with the data available in the literature. The different graphical tools and statistical tests were used to analyse the data.

RESULTS

A total of 152 patients presenting with dengue were included in the study. There were 105 males (69%) and 47 females (31%). Male to female ratio was 2.23: 1.TABLE no 3.

Average age of the patients was years with range of 15 to 75 years. Patients age was divided into six groups, out of which most common age group for presenting with dengue was 15 to 25 years (42.76).65 patients were present in this age group, 38 (25%) patients were in range of 26 to 36 years, 20 (13.16%) in range of 36 to 45 years, 12 (7.89%) in 46 to 55 years, 12 (7.89) in age group of 56 to 65 years , 5 (3.29%) in age range of 66 to 75. TABLE no 1.

The frequency of Bicytopenia was observed in 45 (29.6%) out of 152 cases while 107 (70.4%) out of 152 patients were free of bicytopenia. TABLE no 3.

Age wise prevalence of bicytopenia shows that it was mostly present in extreme of ages, i.e., younger patients with age group of 15 to 25 years (33.85%) and in 66 to 75 years (40%). TABLE no 2.

Gender wise distribution of bicytopenia shows that males were slightly more affected (33.33%) as compared to females (21.28%).Among 45 patients with bicytopenia 35 were male and 10 were females. TABLE no 3.

DISCUSSION

During the period of 2017 to 2018 152 admitted patients were selected for our study. Out of 152 patients

Table 1: Age wise distribution of Patients

Age (In Years)	Frequency (N)	Percent (%)	Mean ± SD
15 – 25	65	42.76	3.5 years with SD = 1.7
26 – 35	38	25	
36 – 45	20	13.16	
46 – 55	12	7.89	
56 – 65	12	7.89	
66 – 75	5	3.29	
TOTAL =	152	100	

Table 2: Age Wise Distribution of Bicytopenia

Age (years)	Frequency (n/n)	Percent (%)
15 – 25	22/65	33.85
26 – 35	09/38	23.68
36 – 45	06/20	30.00
46 – 55	03/12	25.00
56 – 65	03/12	25.00
66 – 75	02/5	40.00
TOTAL	45/152	

Table 3: Gender Wise Distribution of Bicytopenia

Gender	Bicytopenia		Total
	Yes	no	
Male	35	70	105
	33.33%	66.66%	100%
Female	10	37	47
	21.28%	78.72%	100%
Total	45	107	152
	29.60%	70.39%	100%

of dengue 105 were males while 47 were females. Males were affected more than the female in the present study with ratio of 2.3: 1.

Similar observation were made by others (2.67:1 in Deshwal et al, 2.07:1 in Patil et al, 1.8:1 in Kumar et al, 1.7:1 in Kauser et al) showed increased preponderance among males due to increased outdoor activities of male and more exposure to the environment causing dengue.[12-15] Patients of ages 15 to 25 years were affected the most (65 out of 152 i.e 42.76%) as given in table . Similar results were also observed by Patil et al (73.01% in <30 years group), Sharma et al (65.81% in 11-30 years patients), Parmar et al (76%).[13,16,17] It was found in our present study, that although elders weren't that much exposed to catch dengue but once caught, they were more prone to develop bicytopenia than all other age groups.

Dengue is associated with cytopenia. .REFRENCE. So a complete blood count analysis can help us in diagnosis and ruling out other diseases as well apart from the appropriate clinical assessment of the patients.

Leucopenia is also associated with diseases like enteric fever and malaria, so while making clinical assessment of dengue, sometime getting Leucopenia misdirects the clinician against the diagnosis of dengue and thus towards the delay in management and recovery of the patients.

CONCLUSOIN

Maximum prevalence of dengue is in extreme of ages, i.e., in young aged and old aged patients and more common in males. Young population bears greater burden of disease. Bicytopenia constitutes as an immense value as indicator for clinical diagnosis of dengue. It's very important to know the common causes of bicytopenia in our community as some of them are completely curable while others can be treated to reduce morbidity and prolong survival. Prompt diagnosis and immediate specific treatment with maintenance of platelet count, TLC and haemostatic function gives good recovery.

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