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WHITE BLOOD CELLS AND PLATELETS AS PREDICTIVE PARAMETERS IN DENGUE FEVER

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ABSTRACT

Dengue fever is an epidemical viral infection which causes the death of dozens in some of the Yemeni governorates recently. The aim of this study was to consider whether dengue infection can be suspected based on haematological findings. We studied 70 positive cases for dengue infection based on anti-dengue immunoglobulin (NS1, IgM and IgG) test. The most common haematological findings were thrombocytopenia, leucopenia. The total WBC count was of <2000/µl and the platelet count was of <100,000/µl. These findings can be considered as predictors of dengue infection.

KEYWORDS: Dengue fever, WBC count, platelet count.

INTRODUCTION

Dengue fever is a viral infection transmitted by *Aedes aegypti* and *Aedes albopictus* mosquitoes. Dengue (DEN V) is caused by an ssRNA virus belonging to flaviviridae family, and are classified into four serotypes-DEN V-1,2,3 and 4.[1] Dengue is now endemic in over 100 countries, WHO estimates 50-100 million cases of dengue each year. More than three hundred thousand cases ofdengue hemorrhagic fever (DHF) are diagnosed each year, resulting in 24,000 deaths per year.[2,3]

In humans, DEN V infection leads to a spectrum of clinical manifestations that range from in an apparent or mild febrile illness as dengue fever (DF) to its complications such as dengue haemorrhagic fever(DHF) and dengue shock syndrome (DSS).[4]

An epidemic of dengue fever in Yemen was reported to have occurred in 1954 in Hodeidah governorate.[5] In 1984, travelers returning from Yemen to USA were serologically confirmed to have the dengue.[6] The first dengue outbreak was recorded in 2003, in Shabwah governorate. Later on, WHO reported that the dengue fever became epidemic in some parts of Yemen, spread in the costal planes of Tehama and Abyan.[7] Hence, dengue viruses were clearly endemic in several Yemeni governorates.[8,9]

Serological testing is currently the standard diagnostic practice for the confirmation of dengue infection.[10,11] The diagnosis of dengue fever was based on clinical, epidemiological and laboratory data. Among the laboratory tests, blood count (CBC), prothrombin time (PT), liver function tests and serology for antibody examination were used.[12,13]

The aim of this study was carried out to estimate some laboratory tests among the selected dengue fever disease cases in two area at lahej governorate, Yemen.

MATERIALS AND METHODS

Among the suspected dengue fever disease cases, Tuban and Habilgber area of Lahj governorate, Yemen during May- July 2017, we selected 70 positive dengue fever cases (15-50 years age). Haematological and serological investigations were studied in such patients, 5 ml of blood was drawn, 2 ml was collected into EDTA tubes for the blood count (CBC) and another 3 ml in plain tubes for serological investigations. The blood count (CBC) was evaluated three times for the selected patients, using Sysmex automated heamatology analyzer.

The test for dengue was carried out using a combo rapid test- cassette (Onsite, CTK Biotech, USA) for the detection of NS1antigen and differential detection of IgM and IgG antibodies to dengue virus in human serum.

RESULT AND DISCUSSION

The selected patients in this study presented with clinical manifestations of fever, headache, joint pain and vomiting for 3 to 5 days(table 1). Among the studied cases, the majority showed only antigen NS1 positivity (60 cases), and patients was positive for only antibodies or a combination of both antigen and antibodies after one week of the occurrence of dengue fever symptoms (table 2). The haematological changes were thrombocytopenia and leucopenia.

The total WBC count was less than 2000/µl in 53 (75.7%) of the cases, whereas the WBC count was more than 2000 cells/µl in 17 (24.3%) of the cases (Table 3). The results showed, platelet count was of <100,000/µl(40,000-99,000/µl) in 40 (57%) of the cases and >100,000/µl (100,000- 150,000/µl) in 30 (43%) of the cases (Table 4).

The collected specimens were diagnosed by serologic test for detect NS1antigen, IgM and IgG antibodies of the dengue virus. About 60 cases showed antigen NS1 positivity and 20 cases showed antigen NS1 with IgM and IgG antibodies. The results were in agreement with that reported by.[2,9]

In this study, the common haematological findings were thrombocytopenia and leucopenia. The previous studies showed that the common features occurred during the dengue fever were the reducing of white blood cell count (<5000/µl) and platelet count (<140,000/µl).[14,15]

The 40 cases of the selected patients had platelet counts between 40,000 – 99,000/ µl. Arshad*et al*[10], found the platelet count of less than 50000/c.mm was in 78% of patients and Banerjee *et al*[16], the platelet count ranged between 40,000 – 100,000 cells/c.mm in 19% of cases, and 40% by.[14] Jayashree et al indicated, the platelet counts were found to be predictive as well as recovery parameter of dengue fever.[17]

Table 1: Clinical manifestations of patients with dengue infection.

Feature	No. of cases (%)
Fever	100
Headache	100
Joint pain	90
Vomiting	30

Table 2: Pattern of dengue antigen and antibody positivity.

Antigen/antibody	No. of cases
NS1+	60
NS1+, IgG+	4
NS1+, IgM+	6
Total	70

Table 3: Total WBC counts of patients.

WBC count/µl	No. of cases
1000-1500	22
1500- 1800	17
1800- 2000	14
>2000	17

Table 4: Platelet counts of patients.

Platelet count/µl	No. of cases
40,000-55,000	13
56,000-70,000	18
71,000-99,000	9
100,000-150,000	30

REFERENCES

1. Francisa Raimunda F.Guerreiro Azin et al. dengue: profile of hematological & biochemical dynamics. Rev Bras Hematol Hemoter., 2012; 34(1): 36-41.
2. Rashmimv and Hamsaveena. Haematological and biochemical markers as predictors of dengue infection, Malaysian J Pathol, December 2015; 247-51.
3. World Health Organisation, 2009. Dengue: Guidelines for Diagnosis, Treatment, Prevention and Control. New Edition, World Health Organisation and TDR for research on diseases of poverty.
4. Ragini Mishra, Prashanth Kumar. A study on outbreak of dengue from Bihar, India-establishing new foci, attributable to climatic changes. Journal of public health and epidemiology, 2011; 3: 499-502.
5. NAS. In: Tropical Health: A Report on a study of needs and resources. WashingtonDC, National Academy of Sciences; National Research Council, 1962; 107-108.
6. Jimenez-Lucho VE, Fisher EJ, and Saravolatz LD. Dengue with hemorrhagic manifestations: an imported case from the Middle East. American Journal of Tropical Medicine and Hygiene, 1984; 33(4): 650-653.
7. World Health Organization (WHO). Global strategy for dengue prevention and control 2012-2020. Geneva, 2012.
8. Madani TA, El-Tayeb ME, Abuelzein, HMS, Al-Bar EIA, Kao M, Haj HO, and Alabd RB. Outbreak of viral hemorrhagic fever caused by dengue virus type 3 in Al- Mukalla, Yemen. *BMC Infectious Diseases*, 2013; 13(136): 1-6.
9. Qais Yusuf Abdullah, Mahmoud Ogaili, MuradAlahdal and Mohammed Amood AL-Kamarany. Dengue Fever Infection in Hodeidah, Yemen: Risk Factors and Socioeconomic Indicators. British biomedical bulletin, 2015; 3(1): 058-065.
10. Arshad I, Malik FA, Hussain A, Shahida A. Dengue fever clinico-pathologic correlations and their association with poor outcome. Professional Med J., 2011; 18(1): 57-63.

11. Rusmawati I, Asma Hanim H, Naznin M, Salman MS, Norlelawati AT. A descriptive study of blood films of patients serologically positive for dengue in Hospital Tengku Ampuan Afzan, Kuantan. Int Med J Malaysia, 2010; 9(2): 35-7.
12. De Paula SO, Fonseca BA. Dengue: A review of the laboratory tests a clinician must know to achieve a correct diagnosis. Braz J Infect Dis., 2004; 8(6): 390-8. Comment in: Braz J Infect Dis., 2006; 10(6): 371.
13. Srichaikul T, Nimmannita S. Haematology in dengue and dengue haemorrhagic. Baillieres Best Pract Res Clin Haematol., 2000; 13(2): 261-76.
14. Wilder-Smith A, Earnest A, Paton NI. Use of simple laboratory features to distinguish the early stage of severe acute respiratory syndrome from dengue fever. Clin Infect Dis., 2004; 39(12): 1818-23.
15. Somchai Insiripong. Agranulocytosis in Dengue Hemorrhagic Fever: A Neglected Condition, J Med Assoc Thai, 2010; 93(4): 502-4.
16. Banerjee M, Chatterjee T, Choudhary GS, Srinivas V, Kataria VK. Dengue: A clinicohematological profile. MJAFI., 2008; 64(4): 333-6.
17. Jayashree K, Manasa G., Pallavi P., and. Manjunath G. Evaluation of Platelets as Predictive Parameters in Dengue Fever, Indian J Hematol Blood Transfus, July-Sept 2011; 27(3): 127–130.