ACUTE FEBRILE FEVER WITH DENGUE VIRUS INFECTION AT DIAGNOSTIC AND RESEARCH LABORATORY PUMHSW, SHAHEEDBENAZIRABAD (SBA)

Amir Bux Detho[1*], Sikandar Ali Siyal[2], Arooj Ali[3], Abid Hussain Chang[4], Hina Sabeen[5], Sandhiya Kumari[6]

[1*]Associate Professor, Department of Pathology PUMHS(W) Nawabshah (SBA), Sindh Pakistan.
[2]Associate Professor, Department of Pathology PUMHS(W) Nawabshah (SBA), Sindh Pakistan.
[3]Lecturer & Postgraduate Student, Department of Pathology PUMHS(W) Nawabshah (SBA), Sindh Pakistan.
[4]Professor, Department of Pathology, Liaquat University of Medical & Health Sciences, Jamshoro Sindh Pakistan.
[5]Lecturer, Department of Pathology PUMHS(W) Nawabshah (SBA), Sindh Pakistan.
[6]Postgraduate Student, Department of Pathology PUMHS(W) Nawabshah (SBA), Sindh Pakistan.

*Corresponding Author: Dr Amir Bux Detho
*Email: dramirbuxdetho65@gmail.com

ABSTRACT

Objective: To determine frequency of dengue virus infection among acute febrile fever patients. To assess an association of hematological parameters with dengue fever.

Study Design: A cross-sectional study

Place and duration: Diagnostic and Research (DR) Laboratory of Pathology Department PUMHSW(SBA) from January 2022 to June 2022.

Methodology: This study was conducted on 240 blood samples from acute febrile patients. Serum was used for serology while EDTA test tubes were used for hematological parameters. Samples were tested for the presence of NS1 antigen and dengue IgM antibody. Dengue NS1 antigen was detected in laboratory by using rapid device test (DFI diagnostics) the immune-chromatographic technique, while serological testing IgM antibody was detected by ELISA (Mac-ELISA). Panbio™ Dengue IgM Capture ELISA kits were used. Hematological findings were derived from complete blood count and recorded.

Results: A sum of 240 cases presented with classical characteristics of Dengue fever. Out of which majority of the cases were in their third decade of life expectancy with median age of 30.5 years. A total of 240 patients were tested. Out of these 36(15%) were found to be positive for dengue virus and remaining 204 (85%) appeared to be negative for dengue. Among Dengue negatives, 18(8.82%) and 10(4.90%) were positive (+ve). for malarial parasite (M.P) and typhoid fever(typhidot) consecutively. Strikingly 176 (86.28%) patients remained undiagnosed.

Conclusion: WHO states that RDTs are less reliable and sensitive. So it is need of hour to apply an advanced and sophisticated approach for confirmation. Mac-ELISA confirms and testifies rapid and diagnostic tests.

Keywords: Acute febrile fever, dengue fever, Mac-ELISA

INTRODUCTION

Dengue virus is the one among flavi-viruses, other included are yellow fever, West Nile, Japanese encephalitis, and tick-borne encephalitis viruses. Two pairs of Japanese scientists isolated dengue virus during 1943 epidemic in Nagasaki(www.nature.com).[1] WHO approximates that there may be 50 million dengue infections worldwide every year. In South Asia dengue infection is declared an endemic by WHO. Pakistan is at high risk and has been hit by many epidemics.[2] Dengue fever is vector borne disease. It is arboviral disease occurred by bite of arthropod the Aedes Aegypti the female mosquito. There are four different serotypes ranging from DEN_1 to DEN_4. Dengue virus infection has seasonal variation, significantly arises during rainfall and rise of temperature.[2] Serotype DEN_1 is believed to produce lifelong immunity however same individual can be infected with another serotype. Dengue fever is also familiar as break bone fever and dandy fever. Dengue infection extends from classic dengue fever to Dengue hemorrhagic fever (DHF) and severe form dengue shock syndrome(DSS).[3]Acute febrile illness is a common cause of hospital admission, and although it is not recognized as a disease state by the World Health Organization (WHO), its associated infectious causes contribute to substantial morbidity and death among children worldwide.[4]

MATERIAL AND METHODS

This cross sectional, descriptive study was conducted at DR Laboratory, PUMHSW, Shaheed Benazirabad (SBA). Around 240 Blood samples were taken aseptically from patients having history of acute febrile illness, during the period of January 2022 to June 2022. Patients were confirmed for the presence of NS1 antigen and anti-dengue IgM antibody.NS1 antigen and anti-Dengue IgM antibody were detected by rapid device technique(RDT) and Dengue IgM antibody were detected by ICT rapid device method. The M antibody capture ELISA (MAC-ELISA) was used to reconfirm the diagnosis of dengue fever. Complete blood count was performed on Nihon Kohden Cell Counter for haematological parameters.

RESULTS: A sum of 240 cases presented with classical characteristics of Dengue fever. Out of which majority of the cases were in their third decade of life expectancy with median age of 30.5 years(TABLE.1). A total of 240 patients were tested. Out of these 36(15%) were found to be positive for dengue virus and remaining 204 (85%) appeared to be negative for dengue(TABLE.2) Among Dengue negatives, 18(8.82%) and 10(4.90%) were positive (+ve). for malarial parasite (M.P) and typhoid fever(Typhidot) consecutively. Strikingly 176 (86.28%) patients remained undiagnosed. Leucopenia was present in 8(22.22%) while 17(47.22%) showed thrombocytopenia.

TABLE.1. AGE AND GENDER DISTRIBUTION AMONG ACUTE FEBRILE FEVER PATIENTS (N=240)

Age (yrs)	Male	Female	Total	Percentage(%)
1-20	10	18	28	11.66
21-40	74	70	144	60.0
41-60	28	20	48	20.0
>60	12	8	20	8.34
Total	124	116	240	100

TABLE.2. DENV SERO-POSITIVITY AMONG ACUTE FEBRILE CASES (N=36/240)

Type of method	Male	Female	Total
ICT (lateral flow)	9	7	16
Mac-ELISA	11	9	20
	20	16	36

TABLE.3. LEUCO-THROMBOCYTIC ALTERATIONS IN DENGUE POSITIVE PATIENTS (N=36)

Parameter	No. of patients	Percent (%)
WBCs(4.0-11.0X10^9/L):		
With leucopenia(<4)	8	22.22
Without leucopenia	28	77.78
Platelets(150-450X10^9/L)		
With thrombocytopenia(<150)	17	47.22
Without thrombocytopenia	19	52.78

DISCUSSION

Majority of patients 144(60.0%) were in age group of 21-40 yrs while minority 20(8.34%) were above 60 yrs. These findings agree with statements of Gitika et al, 2018.[5] This study concurs well with a study by Khattak et al.[6] This study shows that males suffered more than females (74:70=1.057:1.0) showing an accordance with Patil, and Kanabur, 2019.[7]This value supports previous findings elicted by Khattak et al.[6]

 Both age group and gender distribution are consistent with study conducted by Khan YM et al.[8] NS1 is the earliest and the most reliable indicator of DENV infection. It can be elicited in serum as early as one day after onset of clinical symptoms.[9]Both the lateral flow assay and the capture ELISA, are extremely sensitive, low cost, and user-friendly methods for identifying dengue virus infection.[10] leucopenia was seen in 22% of total dengue confirmed cases, a similar finding was observed by Patel MK and Patel HJ.[11] This study showed prevalence of thrombocytopenia 17(47.22%) in dengue fever and 19(52.78%) did not show thrombocytopenia. This is an agreement with a study conducted by Castilho BM et al.[12]

CONCLUSION

An acute state of febrile patients need emergent rapid and reliable action. Therefore, Mac-ELISA was selected as a choice in order to meet reliability, sensitivity and specificity.

REFERENCES:

1. www.nature.com
2. Jahan F. Dengue fever (DF) in Pakistan. Asia pacific family medicine. 2011 Dec;10:1-4.
3. Qidwai W. Dengue Outbreak in Pakistan: Status, Challenges and way Forward. J Liaquat Uni Med Health Sci. 2019;18(04):250-1.
4. Iroh Tam PY, Obaro SK, Storch G. Challenges in the etiology and diagnosis of acute febrile illness in children in low-and middle-income countries. Journal of the Pediatric Infectious Diseases Society. 2016 Jun 1;5(2):190-205.
5. Gitika G, Garg M, Gill GS. Evaluation of hematological and biochemical profile of early dengue patients. International Journal of Contemporary Medical Research [IJCMR]. 2018 Jun;5(6):F1-4.
6. Khattak IQ, Zeb F, Taj A, Shaheen R, Ishfaq M, Mehmood N. Frequency of bicytopenia (leucopenia and thrombocytopenia) in dengue patients. KJMS. 2018 Sep;11(3):394.
7. Patil PJ, Kanabur DR. Clinical and hematological profile in dengue.International Journal of Medical Science and Public Health, 2019.
8. Khan MY, Venkateshwarlu C, Sandeep N, Krishna AH. A study of clinical and laboratory profile of dengue fever in a tertiary care hospital, Nizamabad, Telangana State, India. Headache. 2016;115:76-7.
9. Parkash O, Hanim Shueb R. Diagnosis of dengue infection using conventional and biosensor based techniques. Viruses. 2015 Oct 19;7(10):5410-27.

10. Lai SC, Huang YY, Shu PY, Chang SF, Hsieh PS, Wey JJ, Tsai MH, Ben RJ, Hsu YM, Fang YC, Hsiao ML. Development of an enzyme-linked immunosorbent assay for rapid detection of dengue virus (DENV) NS1 and differentiation of DENV serotypes during early infection. Journal of Clinical Microbiology. 2019 Jul;57(7):10-128.
11. Patel MK, Patel HJ. Assessment of clinical and hematological profile in dengue fever. Int J Adv Med 2020;7:1418-22.
12. Castilho BM, Silva MT, Freitas ARR, et al. Factors associated with thrombocytopenia in patients with dengue fever: a retrospective cohort study. BMJ Open 2020;10:e 035120. doi:10.1136/ bmjopen-2019-035120