

Pattern of Dengue Virus Infection Cases Admitted in Tertiary Care Hospital at Hyderabad, Sindh

Ashraf Khaskheli, Nasreen Qazi, Mahadev Harani, Ikramuddin Ujan

ABSTRACT

OBJECTIVE: To find out the pattern of Dengue virus infection in patients who presented with fever.

STUDY DESIGN: Prospective observational study.

SETTING: This study was conducted at Research and Diagnostic Laboratory, Liaquat University of Medical & Health Sciences at Hyderabad, Sindh from November 2006 to December 2006.

METHODS: During this period all blood samples from 173 patients, suspected to be suffering from dengue fever, dengue hemorrhagic fever and/or dengue shock syndrome, were received and tested for dengue IgM and IgG antibodies. Complete blood counts were also done. Patients with history of headache, retro-orbital pain, arthralgia, rash, and hemorrhagic manifestations, having leucopenia and thrombocytopenia were included in the study.

RESULTS: Most of the patients positive for dengue IgM antibodies were between the age group of 14-years to 50-years (49 males and 12 females). Out of 173 samples 28 were positive for dengue IgM (primary infection) and 21 were positive for dengue IgG (secondary infection). While 12 patients found to have late primary and early secondary response with both dengue IgM and IgG antibodies.

CONCLUSION: Dengue fever presented in all three patterns in Sindh province; males predominated mostly with primary infection.

KEY WORDS: Dengue hemorrhagic fever (DHF), Dengue shock syndrome (DSS), primary infection, secondary infection, pattern.

INTRODUCTION

Dengue is a mosquito transmitted Arboviral disease. It is estimated that the global incidence of dengue fever is 50- 100 million patients each year.¹ The predisposing factors are international travel which spreads new strains to different parts of the world, over population, urbanization, poverty and a weak public health infrastructure.² Today, an estimated 50-100 million cases of dengue fever and 500,000 cases of dengue hemorrhagic fever (DHF), resulting in around 24,000 deaths, occur annually, depending on the epidemic activity.³

This disease is transmitted to human beings principally by the bites of female infected *Aedes aegypti* and less commonly by *Aedes albopictus* mosquitoes. *Aedes aegypti* bite during daytime – two hours after sunrise and few hours before sunset is the most appropriate time.⁴

Clinical manifestations include dengue fever (self limiting flu like illnesses with very low mortality), dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) (10% fatality rate). Primary infection with any of the four serotypes (DEN-1- to DEN-4) will produce life long immunity.⁵ Secondary infection with another serotype puts patients to increased risk of developing DHF. The diagnosis is labeled as primary infection if there is detection of dengue virus IgM antibodies

within 3-5 days after the onset of infection of the disease, which can persist up to 5 months. The condition is said to be secondary if dengue IgG antibodies are detected with peak levels at two weeks after the symptoms. Late primary and early secondary infection is observed by detection of both IgM and IgG antibodies.⁶

The rationale of the study was to find out the pattern of infection at which the patients were brought to hospital with special reference to type of antibodies.

MATERIALS AND METHODS

This prospective descriptive study was performed at Diagnostic and Research Laboratory of Liaquat University of Medical & Health Sciences at Hyderabad from November 2006 to December 2006. All blood samples of patients suspected to have dengue fever were enrolled in the study. The samples were examined for the presence of dengue IgM and IgG antibodies, malarial parasite and complete blood counts also done.

Inclusion Criteria:

Patients giving history of headache, retro-orbital pain, arthralgia, and rash; which may or may not have progressed to hemorrhagic manifestations, having leucopenia and thrombocytopenia were included in the study.

Exclusion Criteria:

Patients with malaria and other hemorrhagic disorders were excluded from the study.

RESULTS

Blood samples of 173 patients were enrolled in the study. Most of the patients were referred from outside the city (52.6%), other patients were admitted in medical, paediatric and gynaecology wards (**Table I**).

The patients were divided in three groups according to the stage at which they presented; 28 (23 males and 5 females) were positive for dengue IgM (primary infection) and 21 (15 males and 06 females) were positive for dengue IgG (secondary infection) while 12 (11 males and 01 female) patients found to have late primary and early secondary response with both dengue IgM & IgG antibodies. There were only 2 patients under the age of 14 years (**Table II**).

Total Leukocyte count was normal in 86.7% of patients, and platelet count was normal in 83.2% patients (**Table III**). Patients with negative tests for dengue fever were 112 (64.73%).

TABLE I: PATIENTS LOCATION

	Frequency	Percentage
Outside referrals	91	52.6
Medical wards	25	26.0
Paediatric wards	27	15.6
Gynaecology Ward	10	05.8
Total	173	100

TABLE II: SUMMARY OF DENGUE POSITIVE RESULTS OBTAINED OUT OF 173 PATIENTS

Parameter	Dengue IgM(n=28)	Dengue IgG (n=21)	Dengue IgM IgG (n=12)
Males	23	15	11
Females	05	06	01
Age (Years)			
< than 14	02	01	00
15 – 50	23	16	09
> 50	03	04	03

DISCUSSION

Out of 173 patients' samples 28 were positive for dengue IgM (primary infection) and 21 were positive for dengue IgG (secondary infection). While 12 patients were found to have late primary and early secondary response with both dengue IgM & IgG antibodies. Most of the patients with positive dengue antibodies were found to have mono or bicytopenia.

TABLE III: LEUKOCYTO AND PLATELETS COUNT (n=17)

Cells	Frequency	Percentage
Total leukocyte count		
Less than 3,000	11	06.4
Between 3-4 thousands	12	06.9
Normal TLC	150	86.7
Platelet count		
Less than 50,000	09	05.2
50-100, 000	20	11.6
Normal platelet count	144	83.2

The current study strongly suggests that dengue is quite common at Sindh province as it is endemic in all continents except Europe, and epidemic hemorrhagic fever occurs in Asia. The incidence is higher in Asian countries than other regions of the world.⁷

According to a recent fact sheet published by WHO in March 2009 the incidence of dengue has grown dramatically around the world in recent decade, two fifths of the world population are now at risk from dengue fever and it is endemic in Asian sub- continent⁸

Most of the patients were referred from outside the city belonging to the urban interior of the Sindh province^{9, 10} where the facilities for the proper sanitation and malaria control are lacking, so the chances of flourishing of these mosquitoes is higher. Proper steps for symptomatic treatment and monitoring are to be taken first.¹¹

The commonest symptoms in our study were fever, arthralgia, myalgia, and retrobulber pain; these associated symptoms can guide a physician to focus on correct diagnosis and treatment¹² A recent study conducted by the Brown MG revealed that there is prevalence of dengue virus antibodies in healthy individuals, so the testing of IgG antibodies will be of limited value and can be dropped from the list of the diagnostic tests to save the cost, rather one should concentrate on dengue IgM antibody detection.¹³

RECOMMENDATIONS

All patients presenting with febrile illness in preceding two weeks should be tested for dengue antibodies.

Complete blood count and peripheral smear examination helps in diagnosis of patients with dengue virus infection.

There is a need to develop resources at district level laboratories in Sindh, so that patients may be diagnosed early and managed accordingly.

There is need for development of the methods for further characterization of dengue virus strains by doing dengue virus Sero-typing.

REFERENCES

1. Gubler DJ. Dengue and dengue hemorrhagic fever. *Clin Microbiol Rev* 1998;11:480–96.
2. Lifson A. Mosquitoes, models, and dengue. *Lancet* 1996;347:1201–2.
3. Rigau-Perez JG, Clark GG, Gubler DJ. Dengue and dengue hemorrhagic and dengue hemorrhagic fever. *Lancet* 1998;358:971-7.
4. Sandosham AA. Dengue hemorrhagic fever. *Med J Malaysia* 1973;28:1-2.
5. Mairuhu AT, Wagenaar J, Brandjes DPM, Van Gorp EC. Dengue: an arthropod-borne disease of global importance. *Eur J Clin Microbiol Infect Dis* 2004;23:425-33.
6. WHO: Guidelines for treatment of dengue fever/dengue hemorrhagic fever in small hospitals. WHO regional office for south East Asia Publication 1999.
7. Jamaiah I, Rohela M, Nissapotorn V, Maizatulkhikama MM. Prevalence of dengue fever and dengue hemorrhagic fever in hospital Tengku Ampuan Rahimah, Klang Salangor, Malaysia. *Southeast Asian J Trop Med & Pub health* 2005;36: 196-201.
8. Guzman MG, Kouri G. Dengue: an update. *Lancet Infect Dis* 2002;2: 33-42.
9. Troyo A, Calderon O, Fuller DO, Solano ME. Seasonal profiles of *Aedes aegypti* (Diptera: Culicidae) larval habitats in an urban area of Costa Rica with history of mosquito control. *J Vector Ecol* 2008;33:76-88.
10. Cox J, Grillet ME, Ramos OM, Amador M, Barrera R. Habitat segregation of dengue virus along the urban environmental gradient. *Am J Trop Med* 2007;76:820-6.
11. Eslar D. Dengue-clinical and Public health ramification. *Aust Fam Physicians* 2009;38(11): 876-9.
12. Jelinek T, Muhlberger N, Harms G, Corachian M, Gbusch P, Knoblock J, et al. Epidemiology and clinical features of imported dengue fever in Europe: Sentinel surveillance data from TropNetEurop. *Clin Infec Dis* 2002;35: 1047-52.
13. Brown MG, Vickers IE, Salas RA, Smikle MF. Seroprevalence of dengue virus antibodies in healthy Jamaicans, *Hum Antibodies* 2009;18(4): 123-6.



AUTHOR AFFILIATION:

Dr. Ashraf Khaskheli (*Corresponding Author*)

Professor, Department of Pathology
Liaquat University of Medical & Health Sciences
(LUMHS), Jamshoro, Sindh-Pakistan.

Dr. Nasreen Qazi

Assistant Professor, Department of Pharmacology
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. Mahadev Harani

Associate professor, Department of Pathology
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. Ikramuddin Ujan

Assistant Professor, Department of pathology
LUMHS, Jamshoro, Sindh-Pakistan.