DOI: 10.21276/aimdr.2018.4.5.MB2

Original Article ISSN (O):2395-2822; ISSN (P):2395-2814

Assessment of Microbiological Profile of Dengue Fever among Patients: An Institutional Based Study.

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Received: June 2018
Accepted: July 2018

ABSTRACT

Background: Dengue is believed to infect 50 to 100 million people worldwide in a year. Dengue is a major challenge to public health, especially in South-East Asia. The present study assessed microbiological profile of Dengue fever among patients. **Methods:** This study was conducted on 120 patients found serologically positive for dengue fever. Rapid immune chromatography method was used for detection of NS1 antigen, and IgM antibody. **Results:** Common clinical manifestation were headache (20%), vomiting (44%), headache (20%), abdominal pain (19%), myalgia (7%), hepatomegaly (42%) and bleeding (12%). The difference was significant (P<0.05). 85% found positive for NS1 and IgM (7%). 8% samples found positive for NS1 and IgM. The difference was significant (P<0.05). 13 patients developed complications of dengue shock syndrome and 7 developed dengue hemorrhagic syndrome. **Conclusion:** Diagnosis of dengue fever in children is challenging. Dengue fever can be diagnosed with different laboratory tests. Among all is detection of NS1 antigen which may be considered as early diagnostic marker for dengue fever.

Keywords: Bleeding, Dengue fever, Rapid immune chromatography.

INTRODUCTION

Dengue is believed to infect 50 to 100 million people worldwide in a year. The mortality is 1-5% without treatment and less than 1% with treatment. Dengue is a major challenge to public health, especially in South-East Asia. It has a wide geographical distribution and can present with a diverse clinical spectrum. 2.5 billion people worldwide live in areas where there is a significant risk of infection by the dengue virus. Infection with the virus can cause a spectrum of illnesses including relatively mild disease with fever, known as classic dengue fever (DF) and more severe forms such as dengue hemorrhagic fever (DHF), dengue shock syndrome (DSS) and less frequently acute hepatitis, disseminated intravascular coagulation, encephalopathy, myocarditis, acute renal failure and hemolytic uremic syndrome both in adults and children.[1]

The origin of word "dengue" is derived from the Swahili phrase ka-dinga pepo which describes the disease is being caused by an evil spirit. The Swahili word Dinga had its origin from Spanish word dengue, meaning fastidious or careful which would describe the gait of a person suffering the bone pain of dengue fever. Benjamin Rush in 1789 called it Break Bone Fever.[2] In 1906, Aedes mosquitoes transmitting the dengue fever was confirmed and in 1907, Dengue was the second disease after "yellow fever" that was shown to be caused by virus. Dengue hemorrhagic fever is first reported in Philippines in 1953, and in 1981 in South America.[3]

During primary infection, IgM appears after 5–6 days and IgM are low or even absent in some cases of secondary infection. IgM antibodies suggest a recent infection; however, they can persist for 2–3 months. High titres of IgG are a criterion of secondary infection. However, in secondary infection, the antibody response may be greater to the primary infecting dengue virus (DENV) serotype than to the infecting DENV serotype. Moreover, extensive cross-reactivity with other flaviviruses and between various DEN serotypes and a low sensitivity in the early stages of infection can limit the utility of serological assays. Viral nonstructural 1 (NS1) antigen is abundant in the serum of patients in the early stages of DEN infection, lasting from 1 to 9 days; therefore, NS1 antigen ELISA, especially when used together with a IgM capture ELISA, is sufficiently informative in an endemic setting.[4] The present study assessed microbiological profile of Dengue fever among patients.

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MATERIALS AND METHODS

This study was conducted in department of microbiology of Mahatma Gandhi Medical College

& Hospital, Jaipur, Rajasthan, India. It included 120 patients (males- 70, females- 50) found serologically positive for dengue fever. Ethical clearance was obtained prior to the study. All patients were informed regarding the study. For detection of NS1 antigen, IgM antibody rapid immune chromatography method was used. 100 µL of patients serum was added to NS1 and 10 µL to IgM device for 20 minutes. Duration of fever was recorded and platelet count was done. Results were subjected to statistical analysis using chi square test. P value<0.05 was considered significant.

RESULTS

[Figure 1] shows common clinical manifestation were headache (20%), vomiting (44%), headache (20%), abdominal pain (19%), myalgia (7%), hepatomegaly (42%) and bleeding (12%). The difference was significant (P<0.05). Graph II shows that 85% found positive for NS1 and IgM (7%). 8% samples found positive for NS1 and IgM. The difference was significant (P<0.05).

[Table 1] shows that 13 patients developed complications of dengue shock syndrome and 7 developed dengue hemorrhagic syndrome.

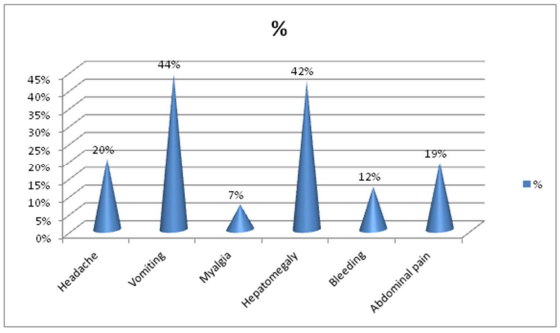

Figure 1: Clinical manifestations of patients

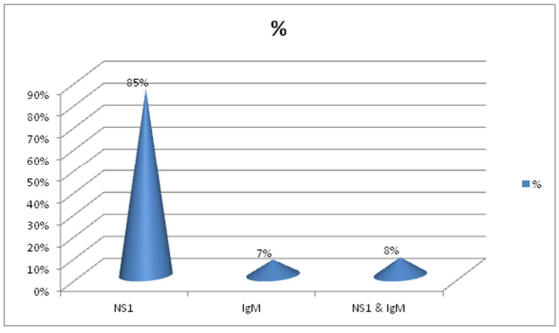

Figure 2: Microbiological profile of Dengue

Table 1: Complications in patients.

Total- 20		
Complications	**Number**	**P value**
Dengue shock syndrome (DSS)	13	0.01
Dengue hemorrhagic syndrome (DHS)	7	

DISCUSSION

Dengue viruses are arboviruses capable of infecting humans and causing outbreaks. Dengue infection can be caused by any one or more of the four different but closely related serotypes; DEN1, DEN2, DEN3 or DEN4 dengue virus of the genus Flavivirus. Dengue fever (DF) is a self-limiting disease in majority of cases, rarely it may cause Dengue Hemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS).[5]

Fever, hepatomegaly, and rashes are common in infants, whereas edema of the lower extremities, retro orbital puffiness, vomiting and convulsions are common manifestations in patients. In India, epidemics are becoming more frequent. Involvement of younger age group with increasing frequency in epidemics is indicators of higher incidence of infection. If untreated, mortality from complications of DF is as high as 20%, whereas early case detection and management, decreases mortality to <1%, especially in children. Dengue specific IgM and IgG ELISA are widely used for diagnosis and exposure to dengue. Women are at high risk than men. The characteristic symptoms of dengue are: a sudden-onset fever, headache, muscle and joint pains, and a rash. The alternative name for dengue, "break-bone fever", comes from the associated muscle and joints pains. The course of infection is divided into three phases: febrile, critical, and recovery.[6] The present study assessed microbiological profile of Dengue fever among patients.

We evaluated various clinical symptoms of dengue fever. These were vomiting, headache, abdominal pain, myalgia, hepatomegaly and bleeding. The most common symptoms were vomiting seen in 44% of cases. Our results are in agreement with the finding of Sharma S et al.[7] However, Astha in her study found abdominal pain to be most common symptoms among patients.[8] The prevalence of abdominal pain in our study was 19%.

We also evaluated effectiveness of NS1 and IgM detection of dengue fever. 85% found positive for NS1 and IgM (7%). 8% samples found positive for NS1 and IgM. This indicates that NS1 is an early diagnostic marker for the detection of dengue fever. Our results are in agreement with the findings of Bennet et al.[9] They conducted study of 104 subjects and found that NS1 found in 72% of subjects as early as on 2nd day of fever. Complications of dengue fever are not uncommon.

Diagnosis of dengue infection is confirmed by the detection of virus, viral genome or NS1 Antigen, or seroconversion of IgM or IgG (from negative to positive IgM/IgG or four-fold increase in the specific antibody titre) in paired sera. Of all the methods available for dengue diagnosis, virus isolation provides the most specific test result.[10] However, facilities that can support viral culture are not always

available. The detection of the viral genome or viral antigens also provides evidence of infection. A large window of opportunity for Dengue diagnosis is provided by NS1 Ag which is highly conserved glycoprotein. Single IgM ELISA test positivity is probable of dengue and definitive diagnosis.[11]

CONCLUSION

Dengue fever can be diagnosed with different laboratory tests. Among all is detection of NS1 antigen which may be considered as early diagnostic marker for dengue fever.

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How to cite this article: Barala M. Assessment of Microbiological Profile of Dengue Fever among Patients: An Institutional Based Study. Ann. Int. Med. Den. Res. 2018; 4(5): MB06-MB08.

Source of Support: Nil, **Conflict of Interest:** None declared