

Original Research

Comparison Of Dengue NS1 Antigen ICT, NS1 ELISA & RTPCR Among The Patients Having <5 Days Of Dengue Like Fever

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Abstract

Introduction: Dengue viral infection is an arboviral disease which is transmitted by *Aedes aegypti* and *Aedes albopictus*. Dengue cases are now increasing a global burden especially in tropical and subtropical countries.¹ The patients with dengue fever have high levels of nonstructural protein-1 (NS1) protein in their serum after onset till <5 days. The present study aims to establish most sensitive and reliable method for the early diagnosis of dengue infection.

Materials & Methods: Total 110 patients were screening who were having <5 days of history of dengue like fever at NIMS Medical College, NIMS University, Jaipur from June 2020 to Oct 2022. For Dengue NS1 ICT & ELISA J. Mitra Pvt Ltd. Kits were used. Dengue RTPCR was done by TRU PCR 3B Black Bio kits as per standard protocol.⁵

Results: Out of 110, total 72 (65.45%) cases were positive (either by ICT, ELISA & RTPCR). Among 72 dengue positive cases 48 (66.6%) were male while 24 (33.4%) were females. Male: female ratio was 2:1 observed. 55 patients were positive by Dengue NS1 ICT, 59 were positive by NS1 ELISA while 72 cases were positive by RTPCR.

Conclusion: Early detection and diagnosis are very important in the case of dengue infection as if it is not treated it may lead to many complications. RTPCR is the most sensitive and specific method for the early diagnosis of dengue. After this covid pandemic most hospitals have RTPCR lab facilities which can be utilized for dengue detection by RTPCR.

Keywords: Dengue, RTPCR, ELISA, DHF

INTRODUCTION

Dengue viral infection is a arboviral disease which is transmitted by *Aedes aegypti* and *Aedes albopictus*. Dengue cases are now increasing a global burden especially in tropical and subtropical countries.¹ *Dengue virus* is a roughly spherical structure composed of the positive-sense single strand of RNA viral genome and capsid proteins surrounded by an envelope and a shell of proteins. Dengue viral genome can be directly translated into proteins. The viral genome encodes ten genes. The genome is translated as a single, long polypeptide and then cut into ten proteins. The dengue virus genome encodes three structural (capsid [C], membrane [M], and envelope [E]) and seven nonstructural (NS1, NS2A, NS2B, NS3, NS4A, NS4B, and NS5) proteins¹⁰. Sequence variation at different loci such as *CprM*, *E/NS1*, *preM/E*, *C/prM/M* and non-translated regions etc have been studied for its association with disease severity.²

Dengue fever is classified in two types- Classical Dengue & Complicated Dengue (DHF & DSS). Dengue fever is characterized by fever with myalgia, arthralgia, abdominal pain retroorbital pain & swelling with thrombocytopenia.³

The diagnosis of dengue is mainly based on ICT & ELISA detecting either NS1 antigen or IgM antibody capture (MAC IgM) in countries where dengue is prevalent.^{1,2} The patients with dengue fever have high levels of nonstructural protein-1 (NS1) protein in their serum after onset till <5 days. The present study aim to establish the most sensitive and reliable method for the early diagnosis of dengue infection.

MATERIALS & METHODS

Total 110 patients were screening who were having <5 days of history of dengue like fever at NIMS Medical College, NIMS University, Jaipur from June 2020 to Oct 2022. 3 ml blood were collected from each patient in clot activator vial. 1 ml serum was separated and Dengue NS1 antigen ICT, NS1 antigen ELISA and Dengue RTPCR were performed.

For Dengue NS1 ag ICT & ELISA J. Mitra Pvt Ltd. Kits were used. Dengue RNA Extraction was done by QIAamp Viral RNA Mini Kit cat log 52904.⁴ And Dengue RTPCR was done by TRU PCR 3B Black Bio kits as per standard protocol.⁵ All the results were analyzed by SPSS software ver 21.

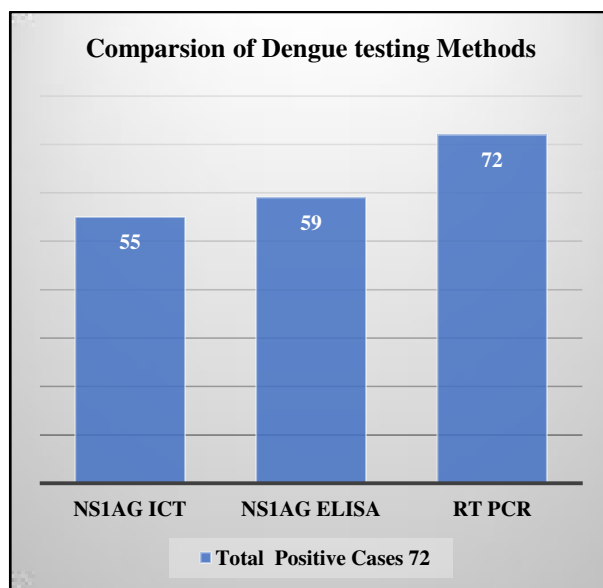
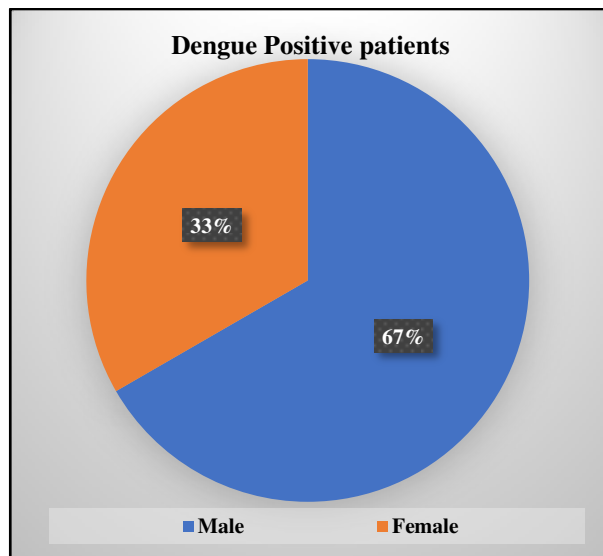
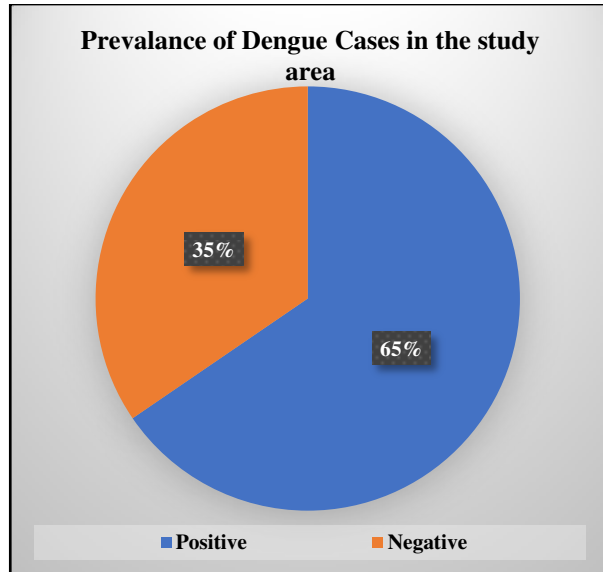
RESULTS

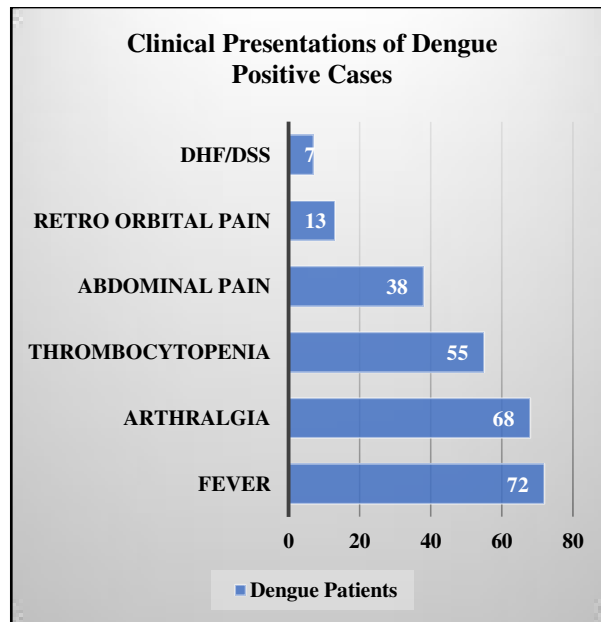
In this present study, total 110 dengue suspected sample were tested for the presence of NS1 antigen by ICT & ELISA followed by Dengue RTPCR. Out of 110, total 72 (65.45%) cases were positive (either by ICT, ELISA & RTPCR).

Among 72 dengue positive cases 48 (66.6%) were male while 24 (33.4%) were females. Male: female ratio was 2:1 observed.

Out of 110 dengue suspected sample, 55 patients were positive by Dengue NS1 ICT, 59 were positive by NS1 ELISA while 72 cases were positive by RTPCR.

All 72 Dengue positive patients were having fever 72 (100%), 68 (94.4%) patients were having arthralgia, 55 (76.38%) were having thrombocytopenia (<1lac), 38 (52.77%) reported with abdominal pain while 7 (9.72%) were found cases of DHF/DSS. No death was observed.





DISCUSSION

Dengue fever is an emerging disease associated with high morbidity and mortality. The diagnosis is still a great challenge in developing countries due to lack of resources, infrastructure and skilled manpower. A recent study published shows that the prevalence of dengue fever occurred in increasing order of each year.⁶ This disease is a major health problem in India and needs to be diagnosed and treated in early phase of the disease to avoid any associated morbidity and mortality.

In this study, 48 cases were males and 24 females, among all the 72 total positive cases. Thus, male preponderance was seen which might be due to more outdoor activities of males as compared to females. Like our study, a study from north India also demonstrated that the males were more commonly affected than females.⁷

The clinical profile of dengue reveals that fever was the most common presenting symptom (100%) in our study. Our results are in agreement with the study by Damodar et al.⁸ In the present study, the other common symptoms next to fever, were, arthralgia/myalgia, 68 cases (94.4%), 55 (76.38%) were having thrombocytopenia (<1lac), 38 (52.77%) reported with abdominal pain while 7 (9.72%) were found cases of DHF/DSS. Similar results were also reported by Goel et al, and Anuradha et al.^{9,10} Retro orbital pain is considered as a cardinal sign in clinical diagnosis of dengue. An Indian study by Laul et al, reported 41% patients of dengue have retro orbital pain.¹¹ However, in our study only 13 (18.05%) of cases have this symptom.

In our study NS1 ICT & ELISA sensitivity and specificity is 90 % and 95%. Many reports show their higher sensitivity and specificity range from 53-96%.¹²⁻¹⁴ The maximum positivity of RT PCR was observed due to high viremia in initial days. Therefore 100 % sensitivity and 100 % specificity were observed.

CONCLUSION

There is neither any specific treatment nor any vaccine is available for dengue so far. Early detection and diagnosis are very important in the case of dengue infection as if it is not treated it may lead to many complications. RTPCR is the most sensitive and specific method for the early diagnosis of dengue. After this covid pandemic most hospitals have RTPCR lab facilities which can be utilized for dengue detection by RTPCR.

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