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Detection of anti DENV IgM and IgG antibodies by evaluating the rapid immunochromatographic technique in hospital at Himmatnagar, Gujarat

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ABSTRACT

Background: Infections arising out of dengue is a prime concern in the country. Himmatnagar too is not devoid of its devastating effects. In order to identify the existence of the virus of dengue, some serological tests are done in the labs. The effectiveness of rapid immunochromatographic test has been accessed in this study in identifying antibodies to Dengue virus (DENV).
Materials and Methods: In this study, the patients having the signs of infection of dengue were included and the serum samples of such patients were obtained for the purpose. The tests of the samples were performed with Panbio Dengue Duo Cassette for the ruling of antibodies of IgG and IgM. Further, for antibody capture test and the detection of the same, immunochromatrgraphic testings were taken into consideration.
Result: The exactness of index for the detection of IgG and IgM can be traced down with the results where the sensitivity lasted with figures like 79% and 83% along with specificity having a figure of 65% and 58% whilst the positive and negative predictive values remained 57 and 64 percent as well as 85 and 72 percent respectively. (Decimals either contracted or rounded off).
Conclusion: The device showcased approval to DENVs in perceiving the IgG and IgM antibodies but it cannot be suggested for confirmatory diagnostic test.

1. Introduction

Dengue is a virus borne illness which is arthropod. It is a distinct positive- marooned RNA virus of the family Flaviviridae; genus Flavivirus.[1] DENV has four serotypes, DENV 1,2,3 and 4 which are antigenically different and DENV 5 was discovered in Malaysia in 2013.[2] Primary infection is present as Dengue fever and Secondary infections as Dengue hemorrhagic fever. Primary and Secondary symptoms are caused by different serotypes.[3] IgM detection is done to identify primary symptoms and IgG antibodies are detected to confirm secondary symptoms. Our study is mainly focused to determine the performance of a brisk immunochromatographic test tool for the recognition of antibodies IgG and IgM to DENV at a centre in Himmatnagar.

2. Materials and Methods

The samples of serum were collected from suspected patients having positive dengue symptoms.

Two groups were made for the patients with positive indications. The groups were framed as Group-I and Group-II respectively. There were 120 patients in group I while the second group comprised of 80 patients. Serum samples were collected from each patient. Serum sample from group I patient were treated to evaluate IgM antibody with the orientation IgM assess. The patients of Group-II having a total of eighty tasters were treated with a declared IgG assess. The outcomes of group-I convalescents and group-II patients were compared. Comparison were made between rapid test to that of reference test and sensitivity score was

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calculated.

2.1. Dengue duo cassette

It is a device used to perceive jointly IgG and IgM in a retiring inspection. It works on skill called immunochromatography. Confirmatory tasters craft a line in pink in the detection of IgG and IgM whereas pink line present in control position indicates negative sample.

2.2. Dengue IgM antibody capture ELISA

By this ELISA method we detect dengue specific IgM antibody. Reactive and non-reactive of sample is based on the relation of absorbance of sample to that of downbeat management. Reactive sample has ratio superior than or equivalent to 2.1, whereas negative samples have relation inferior or indistinguishable to 1.9 and quotients bigger than 1.9 however fewer than 2.1 were considered vacillating.

2.3. Dengue IgG antibody capture ELISA

Through this technique we detect the dengue specific IgG antibody. Samples are declared positive or negative on the basis of index value. If index value is more than 2.2 then sample is considered positive, and it is negative in case index value is less than 1.8. Tasters with index rate amidst 1.8 and 2.2 were calculated slanted. Rate of index is proportion of taster retention to cut-off consumption. Data of fusion proportions of IgG and IgM indication assess are brought in MS Excel and analyzed using version 12 of SPSS.

3. Result

120 samples from group I patients were selected for detection of anti dengue virus specific IgM antibody with reference IgM identification. The accuracy indices evaluated by comparing IgM detection by rapid devices and IgM capture assay is estimated and revealed in Table 1. 80 samples were selected for detection of dengue virus specific IgG antibody by rapid device and IgG capture assay. The readings for both the examinations were evaluated. In addition to exactness, index was recognized and portrayed in Table 1.

For the recognition of IgG and IgM, the sensitivity is 80% and 83% in that line. On the other, the specificity for exposure of IgG as well as IgM is 65% and 58% in that order. IgM keeps an inferior recognition rate with 57% in comparison with exposure of IgG which contains the rate of 64%. The negative prognostic rate for both IgM and IgG is 85% and 72% correspondingly. (Decimals either contracted or rounded off).

4. Discussion

Dengue viruses have been isolated in India in around 1960s.[4] Dengue fever is the major concern in Gujarat

Table 1: Rapid test accuracy indices

Test	Sensitivity (95% CI)	Specificity (95% CI)	Positive predictive value(PPV) (95% CI)	Negative predictive value(NPV) (95% CI)	Positive likelihood ratio (+LR)	Negative likelihood ratio (-LR)	Diagnostic odd ratio (DOR)	Accuracy (%)
IgM	79.25 (72.7-85.8)	64.55 (57.3-71.8)	57.35 (50.7-64.0)	84.75 (79.3-90.2)	2.7	0.28	11.5	78
IgG	82.8 (75.6-90.0)	57.95 (46.6-69.3)	64.25 (60.2-68.3)	71.7 (61.2-82.2)	1.72	0.17	13.0	70.1

*Accuracy = TP+TN/TP+TN+FP+FN (TP-true positive, TN-true negative, FP- False positive, FN- False negative)

und the India.[5] This study was performed to identify the accuracy and sensitivity of rapid card test to that of reference capture assay. Performance and accuracy of rapid device can be improved by collecting paired tasters of blood amid sensitive as well as recuperative sera.[6] Depiction of samples among heightened and restorative sera for recognition antibody (IgM) demonstrated advancement in specificity but sensitivity was found to have negligible expansion.[7]

Apart from the presence of mosquito vector in rainy seasons, incidence of a number of IgM dengue affirmative cases needs attention. Assemblage of water encourages transmission thus serving in the upholding of the vector populace during all seasons. Therefore, the incidence of dengue was reported all the round with a hike in rainy season.[8]

With rapid test by using paired serum specimen, all the samples collected were positive. By using first serum specimen only 71% of cases only showed positive by rapid test. Our study showed that IgM antibody titer is elevated by the day 5^{th} of illness, same result was seen in previous some studies also.[9–11] Secondary dengue virus contamination displayed lofty IgG with IgM or without IgM elevation.[12]

5. Conclusion

Our study concludes that rapid card test can be used for preliminary screening of dengue infection but not for confirmation of infection as it is not sensitive in comparison to antibody capture assay so we suggest not using rapid test as confirmatory tool but use only as preliminary investigation tool.

6. Source of Funding

None.

7. Conflict of Interest

None.

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