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“THE CORRELATION BETWEEN LIVER FUNCTION TESTS AND DENGUE VIRUS SEROPREVALENCE AT A TERTIARY CARE HOSPITAL IN KANPUR”

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ABSTRACT:

Introduction: Overview The most significant arthopod-borne disease, dengue virus (DENV), is spread to humans by Aedes family mosquitoes. Since 1967, dengue infections have been linked to hepatic damage. Hepatic dysfunction can range from modest injury with elevated transmission to severe hepatocyte injury, which can lead to hepatotoxicity and jaundice, as well as a weakened host immunological response to the virus. **AIM**:To Study the dengue virus's seroprevalence and its co-relationship to liver function tests in a tertiary care hospital in Kanpur **material method ;**A Total of 70 patients registered from 1stmarch 2024 to 28february 2025s with the fever of dengue like symptoms where serologically tested for dengue fever using rapid immune-chromatography test (ICT) to detect dengue NS1 antigen, IgM and IgG antibodies were studied.

ICT is a qualitative membrane-based immunoassay test for the detection of dengue specific non-structural protein 1 (NS1) antigen and antibodies in whole blood, serum or plasma.

The detection of at least one component (NS1 or IgM) was regarded as positive, and the results were graded as reactive (no band). The outcome forty five of the seventy patients were male, and twenty-five were female. Out Of the these, 15 were positive for NS1 alone, 17 for IgM and IgG, 6 for NS1 and IgG, and two for Ns1 IgG. All of the patients were serologically out of 40 positive patient LFT ranges were increased 27 patient ALT (Alanine aminotransferase & decreased in 5 patients AST (aspartate aminotransferase)..

Conclusion:Dengue poses a significant public health challenge in India. The peak incidence of cases occurs in October and November due to an increase in vector transmission. ICT is a rapid test that proves beneficial for the early detection of dengue cases.

KEYWORDS: Ns1, IgG, IgM, LFT

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INTRODUCTION:

The dengue virus (DENV), responsible for one of the most significant diseases transmitted by arthropods, is spread to humans through mosquitoes of the *Aedes* species. [1] There are four distinct serotypes of the dengue virus (DENV-1, DENV-2, DENV-3, and DENV-4), each capable of causing the illness, which typically presents as a mild, self-resolving condition. However, in some cases, dengue fever (DF) can progress into more serious forms, such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS).

[2] In 2009, the World Health Organization (WHO) introduced a revised classification for dengue, categorizing it as either "dengue with or without warning signs" or "severe dengue." [3] Despite this updated classification, most studies still rely on the traditional classification, which includes dengue fever (DF), dengue hemorrhagic fever (DHF), and dengue shock syndrome (DSS) to define cases.Dengue virus infection poses a significant public health challenge in tropical and subtropical regions worldwide. In India, it is prevalent across almost all states and is a major reason for hospital admissions.[4] Previously, the disease was primarily confined to urban areas, but in recent years, it has also been reported in peri-urban and rural regions.

[5,6] Liver complications associated with dengue have been documented since 1967. [7] The severity of liver dysfunction ranges from mild cases with elevated transaminase levels to severe hepatocyte damage, which can lead to jaundice and hepatotoxicity. This occurs due to an abnormal immune response to the virus, resulting in hepatic impairment. Although fluctuations in transaminase levels are generally temporary, they can serve as an important marker to assess disease severity.

[8] According to the World Health Organization (WHO), an estimated 50–100 million people contract dengue annually, while over 2.5 billion individuals are at risk in more than 100 countries. The rise in dengue cases is attributed to rapid and unplanned urbanization, migration from rural to urban areas, inadequate vector control measures, climate change, and poor sanitation, all of which create ideal conditions for mosquito breeding.

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[9] Dengue is caused by four serotypes of the virus—DENV-1, DENV-2, DENV-3, and DENV-4. A person infected with one serotype develops lifelong immunity to that specific strain but remains susceptible to other serotypes.

[10] Diagnosis of dengue is typically done by detecting the non-structural protein-1 (NS1) antigen through capture assays, which can identify the virus up to nine days after the onset of symptoms in primary infections. However, in cases of secondary infections, NS1 remains detectable for a shorter period due to a rapid immune response. Serological tests that identify Immunoglobulin M (IgM) and Immunoglobulin G (IgG) antibodies often face cross-reactivity issues with other flavivirus infections.

Advanced molecular diagnostic methods, such as reverse transcription-polymerase chain reaction (RT-PCR), allow for same-day detection of dengue during its acute phase and can also identify the specific serotype. These PCR-based techniques are highly sensitive, specific, rapid, simpler, and more cost-effective compared to traditional virus isolation methods.

AIM –

To Study the dengue virus's seroprevalence and its co-relationship to liver function tests in a tertiary care hospital in Kanpur.

OBJECTIVE –

1. To conduct screening for dengue virus infection in patients.
2. To identify the NS1 antigen using ICT and ELISA methods.
3. To identify IgM and IgG antibodies using ICT and ELISA methods.
4. To assess liver enzyme levels using the colorimetry method.
5. To analyze the demographic characteristics.
6. To examine the occurrence of dengue virus infection.

MATERIAL AND METHOD –

Type of Study: This study is designed as a cross-sectional observational study to evaluate the serological markers and liver function abnormalities in dengue-positive patients.

Duration of Study: The study will be conducted over a period of 12 months, from March 2024 to February 2025.

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Venue of Study: The study will be carried out in the Department of Microbiology and the Department of Biochemistry, ensuring access to laboratory facilities and necessary diagnostic tools.

Study Population and Sample Size: A total of 70 patients suspected of having dengue fever were included in the study. The inclusion criteria encompassed patients with clinical symptoms suggestive of dengue, such as fever, myalgia, headache, and rash, with confirmatory serological testing. Exclusion criteria involved patients with pre-existing liver diseases, chronic infections, or any other conditions that could influence liver function test results.

Diagnostic Methods: Serological testing for dengue virus infection was performed using enzyme-linked immunosorbent assay (ELISA) to detect non-structural protein 1 (NS1) antigen, Immunoglobulin M (IgM), and Immunoglobulin G (IgG). Patients were classified based on their serological results into different groups:

- NS1 positive only
- IgM and IgG positive
- NS1 and IgG positive
- NS1, IgG, and IgM positive

Liver Function Tests (LFTs): Liver function parameters were analyzed to assess the hepatic impact of dengue infection. The following biochemical markers were evaluated:

- Alanine aminotransferase (ALT)
- Aspartate aminotransferase (AST)
- Total bilirubin
- Serum albumin
- Alkaline phosphatase (ALP)

Data Collection and Statistical Analysis: The demographic data, clinical presentation, and laboratory results were systematically recorded. The statistical analysis was performed using SPSS software, with descriptive statistics used to summarize the findings. The mean values of LFT parameters among dengue-positive patients were compared, and significant deviations were analyzed.

Results: Among the 70 patients included in the study, 42 were male, and 28 were female. Based on serological testing:

- 15 patients tested positive for NS1 antigen only.

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- 17 patients tested positive for both IgM and IgG antibodies.
- 6 patients tested positive for both NS1 antigen and IgG antibodies.
- 2 patients tested positive for NS1, IgG, and IgM antibodies, confirming dengue infection.

Out of the 40 dengue-positive cases, liver function test abnormalities were noted in 27 patients, with an increase in ALT levels, while a decrease in AST levels was observed in 2 patients.

The findings suggest that dengue infection has a significant impact on liver function, as evidenced by the altered ALT and AST levels. Further correlation with disease severity and progression will be explored in subsequent sections of the study.

RESULT:

Out of 70 patient 42 were male and 28 were female out of which 15were positive only for NS1, 17 were positive for IgM and IgG,6were positive for NS1 and IgG and 2 were positive for NS1 IgG tested serologically positive for dengue . out of 40 positive patients LFT ranges were increased in 27 patients ALT (alanine aminotransferase) & decreased in 2 patient AST (aspartate aminotransferase)

Fig1: Rapid show Reactive (NS1 Ag Positive)and non-reactive results

TOTAL POSITIVE CASES OF DENGUE –

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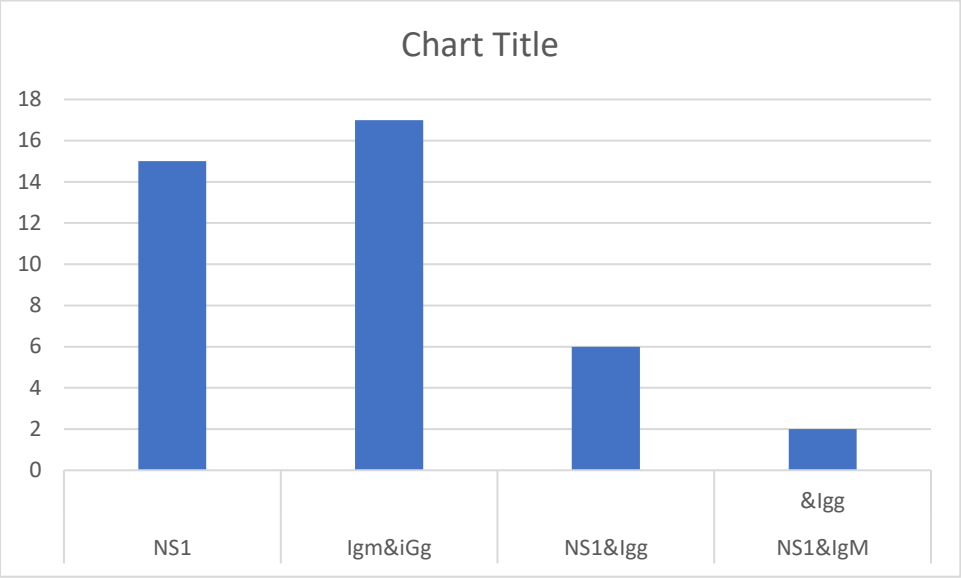

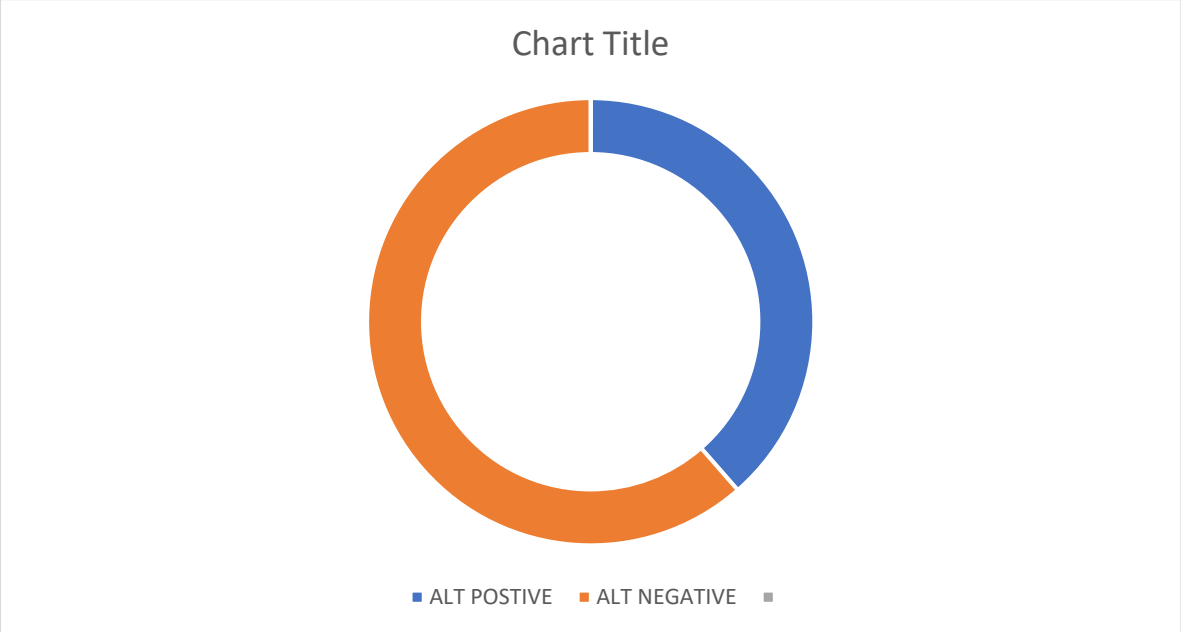

DISCUSSION:

In our study, found that the prevalence of patient with dengue without warning signs (42%) was higher followed by dengue with warning signs with warning signs (57%) and severe dengue (8%). Out of total patients diagnosed dengue NS1 positive (37%) were positive for IgM and IgG antibody (42%), were positive for NS1 and IgG (15%) ,and were positive for NS1 IgG IgM (5%)

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tested serologically positive for dengue out of (46%) positive patient LFT ranges were increase in (26%) patient ALT and decrease in (3%) patient AST. All of these patient with dengue fever were subjected to routine blood investigation for complete blood count and liver function test and dengue serology. Similar results were obtained in a study conducted by Samanta J et al among patients of dengue viral fever and found that effects of dengue virus infection associated with effects on liver function test and histopathological patterns are suggestive of councilman bodies, microvascular steatosis, and liver cell necrosis.

CONCLUSION –

Dengue is a significant public health concern in India, with a higher number of cases typically reported in October and November due to increased vector transmission. ICT provides quick results and has proven useful for the early screening of dengue cases.

REFERENCE –

1.Sheetal S, Jacob E.A Study on the cardiac manifestations of dengue. J Assos physicians Indiac.2016;64(5):30-34.
2. Sam SS, Omar SFS, Teoh BT,Abd-jamilJ,AbuBakarS.Review of dengue hemorrhagic fever fatal cases seen among adults :a retrospective study.PLoSNegl Trop.2013 May 2;7(5):e2194.
3.World health organization. Dengue hemorragic fever: diagnosis, treatment, preventation and control.Geneva,1997.Accessed on 2020 March 2;(6):e2.
4. Ganeshkumar p, Murhekar MV, Poornima V, Saravanakumar et al. dengue infection in India: a systematic review and meta- analysis.ploSNegl Trop DIS. 2018 July 16;12(7):e0006618.
5.Kakkar M. dengue fever is massively under reported in Indiahampering our response.BMJ. 2012 Dec 19; 345: e8574'
6.Chakarvati A, Arora R, Luxembourgs C. fifty years of dengue in IndiaTrans R Soc Trop Med Hyg.2012 May;106(5): 273-82.
7.National centre forvector borne disease control. Directorate general of health services. Ministry of health and family welfare, government of India.
8.Martina BEE,Koraka P, hepatitis in dengue fever. Ceylon med J.1967;12(4):222-23.
9.Sedhain A, Adhikar S,Regmi S, hapatic failure due to dengue. Kathmandu univ Med J (KUMJ) 2011 Apr-Jun;9(34):73-5.
10.Seneviratne SL, pathogenesis of liver involvement during dengue viral infectionsTrans R Soc Trop Med HYG. 2006;100(7):609-14.

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