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CLINICO-BIOCHEMICAL PROFILE OF DENGUE IN A TERTIARY CARE HOSPITAL

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Abstract :-

Introduction: Dengue fever, a mosquito-borne viral illness, is a serious public health concern in India, presenting as recurrent epidemics and leading to severe morbidity and mortality. Dengue infection is a risk for about 25% of the world's population, primarily those living in tropical and subtropical regions.

Aim: The current study set out to evaluate epidemiology, clinico-biochemical spectrum, the radiological findings and prognosis of dengue fever in order to identify better indicators of the illness in patients.

Material & methods: This was a Prospective review conducted in the period from August 2023 to December 2023 in adults suffering from Dengue fever. Dengue was confirmed by testing NS1 AG, IgG, and IgM in the patients. After admission various detailed clinical evaluation and investigations were carried out to find out the required data and information.

Result: A total of 60 patients with dengue were diagnosed, with the majority being men. The symptoms included high-grade fever(100%), severe myalgia and headache(90%), arthralgia(90%),

vomiting and loose motion(50%), shortness of breath(17%), abdominal swelling(10%), haemorrhagic manifestations(10%), gum bleeding(4%), upper GI bleeding(2%), and haematuria(2%). Anomalies in the blood count (CBC) output were found, including leukopenia(69%), thrombocytopenia(77%), lymphocytosis(38%), eosinopenia(57%), neutrophils(20%), and PCV(33%). Liver function tests (LFT) and renal function tests (RFT) revealed abnormalities linked to dengue, such as elevated AST levels(93%), raised ALT levels(70%), total bilirubin(10%), decreased protein levels(67%), and decreased serum calcium(34%) and phosphate(9%). Anomalies were also observed in the electrocardiogram, X-ray, and ultrasonography reports, with 25.5% showing sinus bradycardia, (18.33%) showing pleural effusion, and (11.7%) showing mild to moderate ascites.

Conclusion: When a patient was diagnosed with dengue, symptoms such as a high grade fever, thrombocytopenia, elevated AST and ALT levels, sinus bradycardia on the ECG, effusion on X-ray reports, and ascites on ultrasonography were all found to be associated with dengue fever.

Introduction :-

Dengue fever, a mosquito-borne viral illness, is a serious public health concern in India, presenting as recurrent epidemics and leading to severe morbidity and mortality. And over the last 30 years, dengue fever has considerably increased its global dissemination (1). Dengue viruses (DV) belong to the Flaviviridae family and have four serotypes: DV-1, DV-2, DV-3, and DV-4. DV is a positive-stranded encapsulated RNA virus with three structural protein genes that encode the nucleocapsid or core (C) protein, a membrane-associated (M) protein, an enveloped (E) glycoprotein, and seven non-structural proteins. It is mostly spread by the Aedes aegypti mosquito, but also by Aedes albopictus (2). The WHO estimates that around 3 billion individuals are at risk of Dengue illness each year. According to NCVBDC from 2018 to 2023 the total number of cases was more than 8 lacs whereas the deaths caused were 1132. (3) Dengue is a complicated illness with many clinical manifestations that can go unnoticed or misinterpreted as other fever-causing tropical infections.(4) Human-mosquito transmission begins one day before fever onset and lasts until the sixth day of sickness, sometimes known as the viremia phase. When a female bites a person in the viremia phase, viral replication (extrinsic incubation) occurs in the vector within eight to twelve days.(5) Following the incubation period, patients often have a quick onset of fever that lasts 2-7 days. Other possible symptoms include myalgia, arthralgia, anorexia, sore throat, headaches, and a macular skin rash.(4,5) There is a range of illness manifestations that can result from dengue, including dengue fever (DF), Dengue Haemorrhagic Fever (DHF) and Dengue Shock Syndrome (DSS). The latter entails either internal bleeding and hypovolemic shock and plasma leakage, or other organ failure, such as encephalopathy.(6) In dengue cases changes like Leukopenia, Thrombocytopenia as well as changes in Liver Function tests(LFT) and Renal Function Test (RFT) are seen prominently. For which this study aims to evaluate every major change in CBC, Biochemical reports, 12 lead ECG, X-ray, and Ultrasonography recorded in dengue fever patients to improve physicians' sensitivity in screening dengue cases and find potential laboratory indicators for this progression.

Methods :-

A prospective review of data for all Patients admitted into the Department of General Medicines, Hi-Tech Medical College and Hospital, Bhubaneswar with the supposition of Dengue Fever over a period (August 2023 to December 2023), was performed. The patient's sample size was 60 for this observational study. Which included Patients from different age groups ranging from (18-65 years) who had two or more symptoms of dengue including High-grade fever, Severe Myalgia and headache, arthralgia. Each of the patients in the patient observation pool had laboratory examinations, including NS1 AG, IgG, and IgM, to determine dengue positivity. Patients found to be negative in these tests were excluded from the study. Patients with chronic Kidney disease and chronic hepatitis were also excluded from the study.

After admission data on the cases including name, address, age, sex, clinical features, blood pressure, and medical history were collected. All the patients were also subjected to under-go complete physical

examination along with laboratory investigations including a complete blood count test, Liver function tests, Renal function tests, ECG, X-ray and ultrasonography. All these data were properly recorded.
During the whole therapy period, symptoms were observed and documented daily. Symptoms ranging from fever and headache to more serious conditions such as myositis and myocarditis were constantly monitored and treated. Also, treatment details, including dengue treatment medication, were documented in a predetermined form.

Management :-
During the trial period, all 60 patients were admitted to the respective facilities. Every patient received round-the-clock care and was always under surveillance. 50% of those with a TPC <30,000 with ascites, pleural effusion, or haemorrhagic symptoms receive symptomatic treatment along with RDP. The remaining 50% of cases were treated with IV fluid in addition to symptomatic care.

Ethics :-
A formal written clearance was taken from the ethics committee of the Institute, and written consents were acquired from the patients.

Statistics :-
Microsoft Excel 2021 was used for statistical analysis. For quantitative data, descriptive statistics were performed using mean and standard deviation; for categorical variables, frequency and proportion were used.

Results :- Every one of the 60 cases had a clinical conformation that indicated Dengue. There were eight women and fifty-two men. The majority of those affected were men. They were separated into three age groups based on the disease: 18–30, 30–50, and >50 (Figure 1). The mean age of the patients was 37.5 (SD 11.2) years.

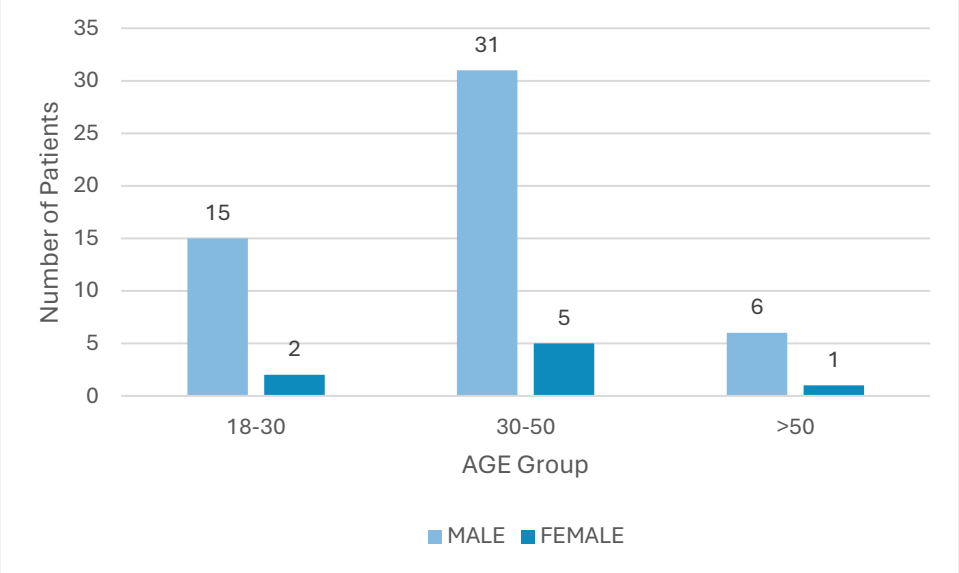

Figure 1: Age & sex distribution

There were numerous significant clinical symptoms reported in the 60 patients. Each of the 60 patients (100%) experienced a high-grade fever; 54 patients (90%) experienced severe myalgia and headache; 54 patients (90%) experienced arthralgia; 30 patients (50%) endured vomiting and a loose motion; 10 patients (16.67%) experienced Shortness of breath; 6 patients (10%) swelling of the abdomen; 6 patients (10%) had haemorrhagic manifestation, and another 6 patients (10%) had

Patechae; 2 patients (3.33%) devloped subconjunctival haemorrhage; 2 patients (3.33%) experienced gum bleeding; 1 patient (1.67%) had upper GI bleed; and 1 patient (1.67%) experienced haematuria.

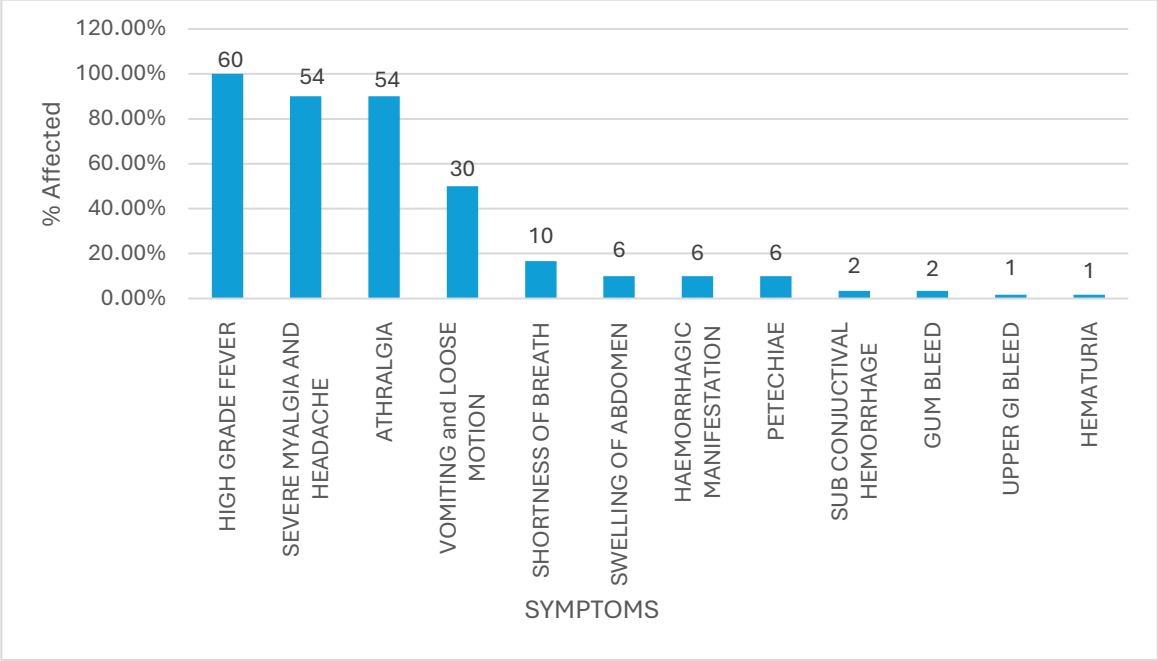

Figure 2: Major clinical manifestations of Dengue

Many anomalies were discovered in the CBC output, including 41 patients (68.33%) with leukopenia, whose mean leukocyte count decreased by 657.07 (SD 598.44). With a mean drop in thrombocyte count of 66680.85 (SD 46831.38), 46 individuals (76.67%) experienced thrombocytopenia. Of them, 23 (38.33%) showed lymphocytosis, with a mean increase in lymphocyte count of 50.90 (SD 14.48). Eosinopenia was present in 34 patients (56.67%), with a mean decrease in eosinophil count of 0.75 (SD 0.28). For 12 patients (20%), there was an increase in neutrophils of 6.29 (SD 6.38). The PCV increased by 1.93 (SD 1.33), for a total of 20 patients (33.33%).

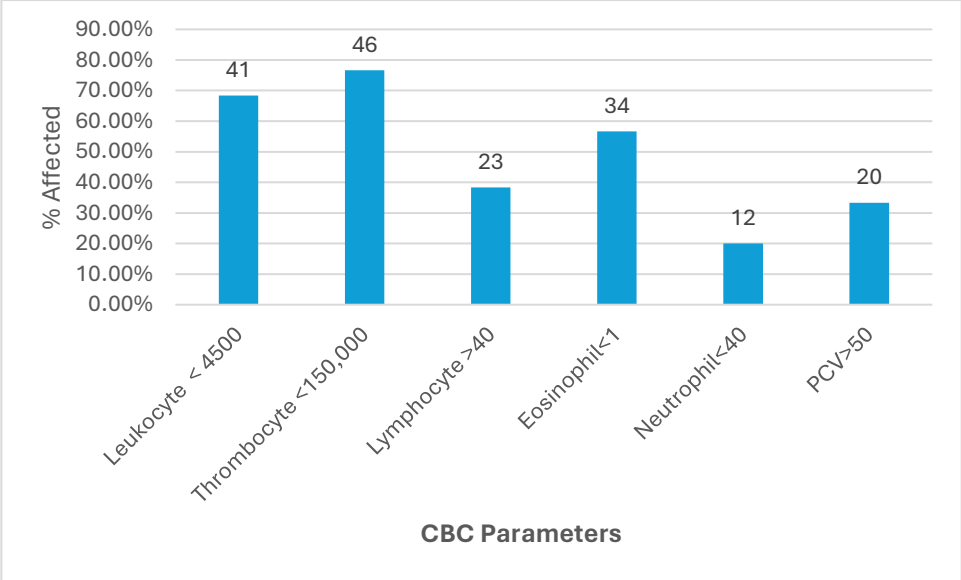

Figure 3: Dengue relation with CBC Report

The LFT (Liver Function Test) and RFT (Renal Function Test) biochemical results also revealed some of the abnormalities linked to dengue. Aspartate aminotransferase (AST) levels were elevated in 56 individuals (93.33%), with a mean rise of 140.75 (SD 78.45). Raised Alanine transaminase (ALT)

levels were seen in 42 patients (70.00%), with a mean rise of 87.93 (SD 35.68). 06 of the patients (10.00%) had a rise in total bilirubin, with a mean increase of 1.53 (SD 0.23). With a mean of 0.44 (SD 0.30) decrease in protein levels, 40 individuals (66.67%) were affected. A mean decrease in serum calcium of 0.75 (SD 0.40) was seen in 50 patients (83.33%) and Serum phosphate decreased in 20 patients (33.33%), with a mean drop of 0.32 (SD 0.17).

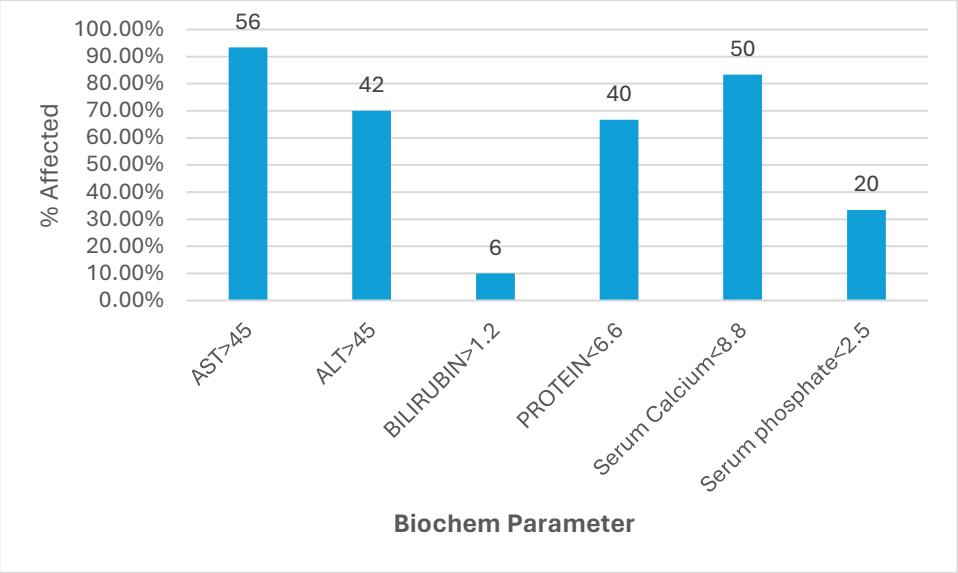

Figure 4: Dengue relation with Biochem Reports

Anomalies were also observed in the reports of the electrocardiogram, X-ray as well as in Ultrasonography, of which 15 patients (25.00%) had observable sinus bradycardia. In contrast to 13 patients (21.67%) who showed mild to moderate B/L pleural effusion on their x-rays, 8 patients (13.33%) exhibited evident mild unilateral pleural effusion. 7 individuals (11.67%) of the total, received ultrasound results indicating they had mild to moderate ascites.

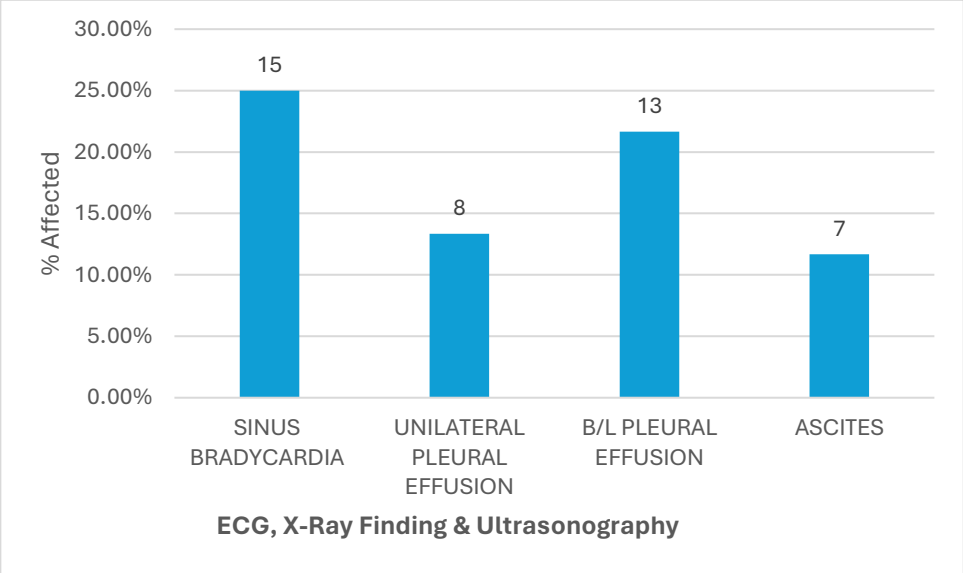

Figure 5: Dengue relation with ECG, X-ray & Ultrasonography Reports

Discussion :-

The clinical profile, laboratory characteristics, and results of DF in adult patients are described in the current article. In this outbreak, gastrointestinal symptoms were found to be highly prevalent. Compared to 38% of patients in Sharma et al.'s study, 50% of patients in this study experienced abdominal discomfort(7).

In the current series, bleeding from a variety of places was far less common (5%). In contrast, Horvath from Australia (8) and Sharma from India (7) found that 63% and 69% of bleeding events, respectively, occurred. Comparing the current series to comparable studies published by other investigations, the gastrointestinal system and gum were the primary locations of bleeding. The reduced incidence of bleeding manifestations may be explained by the fact that increased bleeding from venepuncture sites was not included in this study's definition of bleeding tendency.

While thrombocytopenia was frequently observed, there was little evidence of a relationship between thrombocytopenia and bleeding tendencies—a result that was also noted by Sharma et al(7). 76.67% of patients experienced Thrombocytopenia whereas only 43.8% of the patients were affected in another study.

Another important point of comparison for the patient's clinical profile was the liver function test. In this series raised AST and ALT levels were present in 97.33% and 70.00% of patients, respectively, compared to 88.4% and 76.7% in the Sharma et al. study(7). Raised bilirubin also had some comparable findings, with 10% against 8.82% in the previous study.

Protein, serum calcium, as well as serum phosphate levels, significantly changed in the patients, with noticeable deviations from normal values, as did protein and serum values in RFT findings.

Compared to 24% in the study by Gudi Srinivas et al.(9), 25% of participants in our study have bradycardia. In addition, there was a substantial difference in the percentage of patients afflicted by the effusion discovered in X-ray reports was also shown to be different i.e. this study (16.67%) and another study (3%). While the study by Gudi et al. revealed 9.4% of participants affected by ascites, the ultrasound profile revealed in our study 11.67% of affected subjects(10).

Out of the 60 patients, one patient died as a result of myocarditis, which was the only casualty that occurred during the study; rest of the 59 patients recovered well.

The study's most noteworthy aspects included the large number of patients with thrombocytopenia and eosinopenia in their CBC reports, as well as elevated serum calcium, AST, ALT, and protein levels in their LFT and RFT findings. Effusion and sinus bradycardia were also important in explaining the patho-physiological effects of DF on the body.

Our study's main limitations include its small sample size and the underreporting of instances that are not recognized or reported appropriately. However, by conducting subsequent research, we will be able to determine that mortality and morbidity in dengue cases might be reduced by conducting the proper investigation as soon as a patient reports to the hospital and initiating therapy as soon as possible to aid in the patient's early recovery.

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