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General Medicine

A STUDY OF HEMATOLOGICAL AND BIOCHEMICAL PROFILE IN PATIENTS OF DENGUE FEVER WITH CYTOPENIA

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ABSTRACT **Background:** Dengue Virus infection is a major cause of acute febrile illness and of thrombocytopenia in Indian population. This study is aimed at identifying haematological and biochemical changes associated with dengue fever and dengue haemorrhagic fever, so that the severity and prognosis can be assessed and disease morbidity can be reduced. Also when sophisticated tests are not available, other parameters can be used to assess and manage the patient. **Materials and Methods:** 46 patients presenting with Acute febrile illness, cytopenia and tested positive on ELISA were included. Hematological and Biochemical tests were conducted. Also features like hepatosplenomegaly, bleeding manifestations and mortality were observed. **Results and conclusion:** Dengue is one of the commonest cause of AUFI and is associated with higher prevalence of leucopenia and thrombocytopenia, mild to moderate hepatic dysfunction and mild renal dysfunction

KEYWORDS :

INTRODUCTION

Dengue fever and Dengue haemorrhagic fever together account for a large number of cases with acute fever with cytopenias and presents as outbreaks time and again. According to NVBDCP , in 2018 till September 30th , 40868 cases of dengue have been diagnosed with 83 resulting in mortality. Of these, 3022 cases were reported in Rajasthan with 4 resulting in mortality.[1] Dengue virus(DV) has also been shown to reduce circulating platelet counts independent of virus attachment or entry into platelets or their precursors. Thus, two mechanisms are probably involved in dengue-induced thrombocytopenia: Impaired thrombopoiesis and Peripheral platelet destruction. Leucopenia appears early in the course of illness and is thought to occur as a direct effect of dengue virus on the bone marrow.[2,3] Dengue also causes a transient decrease in maturation of erythroid precursors,[4] however because of the long half-life of the red cells, dengue does not cause severe anemia in infected individuals. [5]An eventual outcome of hepatocyte infection by DV is cellular apoptosis, a phenomenon demonstrated both in vivo and in vitro.[6]Pathogenesis of hepatic injury in dengue is believed to be primarily a T cell mediated process involving interaction between antibodies and the endothelium and a concomitant cytokine storm often labeled as cytokine "Tsunami," and host factors like genetic polymorphisms. Effect to renal function is via glomerulonephritis , rhabdomyolysis, a direct cytopathic effect of the viral protein on the glomerular and tubular cells and Hemolytic Uremic Syndrome.

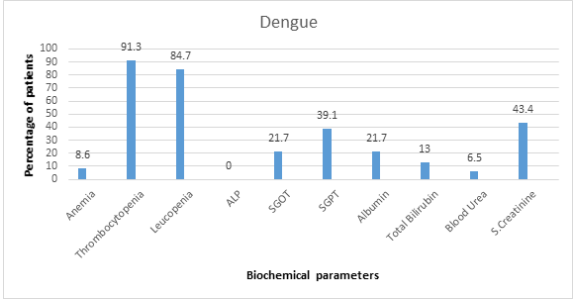
MATERIALS AND METHOD

A prospective study was carried out in 46 patients in Medicine ward and ICU in Geetanjali medical college and hospital, Udaipur. Inclusion criteria were as follow: Acute onset fever of > 3 days and & < 2 weeks duration with, any one or more of the following: Haemoglobin <12gm/dl , Total Leukocyte Count <4000cells/cumm , Platelet count <1.5lacs/cumm and Dengue positive with test: NS1 antigen test(ELISA) and Dengue IgM, IgG serology (ELISA). Exclusion criteria included: Known hematological disorder, Chronic intake of drugs causing cytopenias, presence of chronic liver disease, chronic renal disease, chronic alcohol intake, HIV positive individual, patient requiring intensive care, patients with multiple etiologies. All hematological investigations were performed in GMCH Hematology lab. Viz. Hemoglobin%, Total leucocyte count, Platelet count, Hematocrit, Erythrocyte sedimentation rate and Peripheral smear. Renal function tests, liver function tests, serum electrolytes, urine routine and microscopy and HIV serology were also done.

RESULTS

Amongst the 46 patients positive for Dengue, hepatomegaly was seen in 5 cases (10.8%), splenomegaly in 4 cases (8.6%) and both hepatosplenomegaly in 2 cases (4.3%). Bleeding disorder was seen in 26 cases (56.5%). In the present study, in 46 patients diagnosed with dengue, it was found that hematological parameters which were highly affected are thrombocytopenia (91.3%) and Leucopenia (84.7%), Anemia was relatively low (8.6%). Liver function was deranged with SGPT (39.1%) and SGOT (21.7%), Albumin (21.7%) and Total Bilirubin (13%). Renal functions dysfunction with increased S.Creatinine (43.4%) and Blood Urea (6.5%) was seen (Graph 1).

Graph 1: Deranged Biochemical parameters of dengue



Out of 4 cases of anemia, 2 had mild anemia (Hb of 9 – 11g%) and 2 had severe anemia (Hb < 7g%). Out of 39 cases with leucopenia, 13(33.4%) had mild (WBC 3000 – 4000/cumm), 21(53.8%) had moderate (WBC 2000-3000/cumm) and 5(12.8%) had severe leucopenia (WBC <2000/cumm). Out of 42 cases of thrombocytopenia, 3(7.14%) had mild (≥ 100 and <150X10^9/L), 15(35.8%) had moderate (> 50 and <100X10^9/L) and 24(57.14%) had severe thrombocytopenia (<50X10^9/L).Out of total dengue cases in the study, mortality was seen in 3 cases (6.5%).

DISCUSSION

In our study of 46 patients of Dengue , anemia was seen in only 4 cases(8.6%).Of these , 2 cases had mild anemia (50%) and 2 cases had severe anemia(50%).G Mittal, S Ahmad et al[7] in their study had only 1% anemia among dengue patients. Thus it was noted that the prevalence of anemia is quite low with Dengue.

In our study, 39 cases of dengue (84.7%) out of 46 had leucopenia with 12.8% having severe leucopenia. G Mittal, S Ahmad et al[7] in their study showed 92.9% leucopenia. In the study conducted by, R V Rani et al[8] 63% had leucopenia. In contrast in the study conducted by Vaibhav Shukla, Ashok Chandra et al[9], only 10% patients of dengue had leucopenia.

In our study, 42 patients of dengue had thrombocytopenia (91.3%). Of these, severe thrombocytopenia was found in 57.14%.Bleeding manifesations like Petechiae, Purpura, Hemetemesis, Hematuria, etc were found in 56.5% in Dengue. The study conducted by G Mittal , S Ahmad et al[7] also showed thrombocytopenia in dengue in 92.0% with bleeding manifestations in only about 5.7% The study conducted by

Shah GS, Islam S et al[10] showed thrombocytopenia in 57% only, whereas bleeding manifestations were found in 68% cases.

10.8% cases had isolated hepatomegaly, 8.6% had isolated splenomegaly and 4.3% had hepatosplenomegaly in our study. In contrast, a study conducted by Shah GS, Islam S et al[10] showed hepatomegaly in 77% and splenomegaly in 23%. .The study conducted by G Mittal, S Ahmad et al[7] hepatomegaly was found in 16.6% and splenomegaly in 0.2% only.

In our study, deranged LFT parameters were found: raised SGOT in 21.7% , raised SGPT in 39.1% , raised bilirubin in 13% , albumin was reduced in 21.7% and ALP was normal. In the study conducted by G Mittal , S Ahmad et al[7] SGOT was raised in 17.9% , SGPT in 57% , bilirubin in 15.1% , ALP raised in 1.8% and reduced albumin in 9.9%. In contrast in the study conducted by Vaibhav Shukla, Ashok Chandra et al[9] , elevated SGOT was in 100% and elevated SGPT in 91%.

In our study , deranged RFT parameters were found as increased Serum creatinine in 43.4% and blood urea in 6.5%.The study by K D Salagre , R N Sahayet al[11] 61.6% cases had developed renal failure with average creatinine(range) =1.8007 (0.50-15.60). Muhammad A.M. Khalil et al[12] in their study showed that AKI developed in 13.3% cases of dengue.

In the present study, it was found that out of 46 patients, 3 Dengue fever patient expired. So the mortality was 6.5%. The study done by Chrispal A et al[13] 25% mortality in Dengue. Another study by Patil P et al[14] had mortality in dengue of 4%.

CONCLUSION

Dengue is one of the commonest cause of AUFI and is associated with higher prevalence of leucopenia and thrombocytopenia, mild to moderate hepatic dysfunction and mild renal dysfunction. Active fever surveillance is necessary as clinical diagnosis is not always sufficient to detect all febrile cases. Laboratory confirmation is essential to refine disease burden estimates of common causes of AUFI. A well-established accurate epidemiologic database of different etiologies of fever in every region to anticipate epidemic preparedness in terms of resources and health care delivery should be achieved. Even when proper serological tests are not available, line of management and early care can be established on the basis of other parameters.

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