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CORRELATION OF PLATELET COUNT WITH HEPATIC ENZYMES IN PATIENTS WITH DENGUE FEVER IN A TERTIARY CARE CENTER IN KISHANGANJ, BIHAR.

Internal Medicine

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ABSTRACT

Backgrounds and objectives: Dengue is the most common and important aedes mosquito borne dengue viral disease occurred in Tropical and sub-tropical countries worldwide affecting annually millions of subjects. Clinical presentation may be asymptomatic or develop flu like symptoms to severe form of clinical manifestations. Aim of the study was analysis of platelet count and liver function tests to detect hepatic dysfunction and correlation of platelet count with hepatic enzymes. **Materials and methods:** In this cross-sectional retrospective study all the patients are NS1 positive, they underwent detail clinical examination followed by laboratory investigations involving platelet count and liver function tests. Patient were divided into four groups according to platelet count: 1) < 50000/cc, 2) 50001-100000/cc, 3) 100001/cc-150000/cc and 4) > 150000/cc. **Results:** Among 491 patients males were 282 and female 209. Males significantly demonstrated thrombocytopenia as compared to females. 54.786% of patients demonstrated 50001-100000/cc whereas 19.551% patients had either less than 50000/cc or between 100001-150000/cc. Mean value of ALT and AST are increased more than 3 times than normal when platelet count is less than 100000/cc, but AST is much high as compared to ALT when platelet level is less than 50000/cc. There was significantly very small negative correlation between platelet count and alanine aminotransferase levels when the platelet count was below 100000/cc. But if platelet was above 100000/cc, there was non-significant very small negative correlation between platelet count ALT levels. There is non-significant positive correlation between platelet count and aspartate aminotransferase when platelet count is between 100001-150000/cc but again, there is very small significant negative correlation between platelet count and aspartate aminotransferase when the count is more than 150000/cc. **Conclusion:** In case of thrombocytopenia liver enzymes were elevated more than 3 times of normal. But if platelet count is increased, liver enzymes lowered to normal level.

KEYWORDS

Dengue fever, platelet count, liver enzymes, correlation between liver enzymes and platelet count.

INTRODUCTION:

Dengue is the most important mosquito bone viral disease in Tropical and Sub-Tropical countries of the World like America, South-East Asia, Central America and Carrabin countries, mosquito being Aedes aegypti[1, 2, 3, 4, 5, 6]. Natural host is human being and causative organism is dengue virus, family of Flaviviridae. On the basis of neutralization assay data four serotypes have been recognized like DENV-1, DENV-2, DENV-3 and DENV-4. It annually affects 100 million people including 500000 cases of dengue hemorrhagic fever and dengue shock syndrome and 30000 deaths in the world[7,8]. There is wide spectrum of distribution of clinical symptoms that ranges from flu-like symptoms to severe form of features characterized by increased capillary fragility and permeability, coagulopathy leading to hypovolemic shock[4, 9]. No-a-days most of the laboratories diagnose dengue virus infection by three methods like isolation of virus, viral genome sequence by nucleic acid amplification technology assay i.e. RT-PCR and rapid dengue immunochromatographic test and/or dengue virus specific IgM antibodies detection by IgM-capture enzyme linked immunosorbent assay[7,10]. Thrombocytopenia acts as predictive marker for early diagnosis of dengue virus infection, lower count suggests severe dengue infection[11]. Liver function tests is carried out to detect the hepatic injury as the disease progresses[12]. As the incidence of the disease increases along with increased morbidity, interest is increased in the present study.

Aims of the study:

A. Analysis of platelet count and biochemical abnormalities indicative of hepatic dysfunction,
B. Study of correlation between platelet counts with liver enzymes.

MATERIALS AND METHODS:

This is retrospective cross sectional study done in patients admitted in Tertiary care center in 2019, MGM Medical College & LSK Hospital, Kishanganj, Bihar after getting permission from the local ethical committee. All the patients are NS1 positive, they underwent detail clinical examination followed by laboratory investigations. Patient of under 15 years of age, co-infection and or having thrombocytopenia from other causes have been excluded from this study. Blood samples were collected from each patient in EDTA vacutainer for complete blood count and plain tube for liver function test. In the laboratory complete blood count were carried out by automatic cell counter and for confirmation of platelet count peripheral slides are stained with Leishman stain. Liver functions were estimated by standard chemical automatic analyzer. Patient were divided into four groups according to platelet count: 1) < 50000/cc, 2) 50001-100000/cc, 3) 100001/cc-150000/cc and 4) > 150000/cc.

Statistical analysis:

Mean value with standard deviation of platelet, aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were demonstrated. Then correlation coefficient (r value) with "p" value between platelet and AST and ALT were estimated at different groups of patients by Pearson correlation coefficient calculator.

RESULTS:

Among 491 patients males were 282 and female 209. Males significantly demonstrated thrombocytopenia as compared to females. 54.786% of patients demonstrated 50001-100000/cc whereas 19.551% patients had either less than 50000/cc or between 100001-150000/cc. [Table 1].

Table 1: Sex wise distribution of platelet count:

Platelet count	Male N=282	Female N=209	Percentages	Chi-squared test	P value
< 50000/cc	64	32	19.551	6.541	0.01
50001-100000/cc	132	137	54.786	0.030	0.8617
100001-150000/cc	65	31	19.551	7.439	0.006
>150000/cc	21	9	6.109	2.494	0.114

Mean value of ALT and AST are increased more than 3 times than normal when platelet count is less than 100000/cc, but AST is much high as compared to ALT when platelet level is less than 50000/cc [Table 2].

Table 2: Mean value of platelet, ALT and AST in different ranges of plate count:

Platelet counts	Platelet		Alanine aminotransferase		Aspartate aminotransferase	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
< 50000/cc	33218.75	8652.597	151.1875	219.141	236.8646	474.2492
50001-100000/cc	74237.9182	16142.8757	131.9554	136.4733	164.4461	223.7088
100001-150000/cc	126177.0833	14615.057	84.9375	76.5459	94.3021	87.9149
>150000/cc	180766.6667	30935.621	76.2333	57.2566	52.6333	11.6545

There is significantly very small negative correlation between platelet count and alanine aminotransferase levels when the platelet count is below 100000/cc – it means as platelet count is decreased alanine aminotransferase level increase. But if platelet count is above 100000/cc, there is non-significant very small negative correlation between platelet count ALT levels [Table 3]

Table3: Correlation of plate count with alanine aminotransferase in patients with dengue infection:

Platelet count	Alanine aminotransferase	
	R value	P value
< 50000/cc	-0.3053	0.002
50001-100000/cc	-0.20610	0.0006
100001-150000/cc	-0.1081	0.294
>150000/cc	-0.2387	0.203

There is significantly very small negative correlation between platelet count aspartate aminotransferase (AST) levels when the platelet count is below 100000/cc – it means as platelet count decreases aspartate aminotransferase level is increased. There is non-significant positive correlation between platelet count and aspartate aminotransferase when platelet count is between 100001-150000/cc but again, there is very small significant negative correlation between platelet count and aspartate aminotransferase when the count is more than 150000/cc i.e. as the platelet count increases aspartate aminotransferase will be decreased [Table 4].

Table 4: Correlation of plate count with alanine aminotransferase in patients with dengue infection:

Platelet count	Aspartate aminotransferase	
	R value	P value
< 50000/cc	-0.2908	0.004
50001-100000/cc	-0.1895	0.001
100001-150000/cc	-0.172	0.093
>150000/cc	-0.7836	0.045

DISCUSSION:

There are many predictors that can assess the severity of the disease like progressive thrombocytopenia, abnormal biochemical values suggestive of liver damage[13]. These organ damage may be due to organ dysfunction due to organ leakage or immune-mediated hepatocyte injury[14]. In this present study 54.786% patients demonstrated platelet count between 50001 to 100000/cc which is consistent with the study done by Vasavi P et al where 47.05% patient demonstrated this counts. On the other hand 19.551% patient demonstrated platelet count below 50000/cc. which is contrary to the same study where 30.39% patients demonstrated this platelet counts[15]. AST level was more consistently correlated with decline in platelet count as compared to ALT level which was also demonstrated in the study done by Wong[16]. In the higher platelet count, ALT and AST levels were increased nearly to same amount, but with the gradual decrease in platelet count rise in AST is much higher as compared to ALT which is consistent with the study done by Vasavi P et al[15]. There was also evidence of negative correlation between AST and ALT and platelet count with statistical significance[15,17].

CONCLUSION:

In dengue fever with thrombocytopenia of less than 100000/cc both aspartate and alanine aminotransferases were significantly increased, but between 100001/cc this increase was non-significant. Whereas, if platelet count was more than 150000/cc, there was non-significant decrease in aspartate and alanine aminotransferases.

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