ORIGINAL ARTICLE

Utility of platelet parameters in serologically proven dengue patients

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ABSTRACT:
Background: The dengue virus (DENV), a flavivirus spread by mosquitoes, is the cause of dengue, an acute fever sickness. Dengue etiology and pathophysiology are thought to be significantly influenced by host response. The present study was conducted to evaluate utility of platelet parameters in serologically proven dengue cases. **Materials & Methods:** 65 cases of the laboratory confirmedpositive dengue cases (NS1 antigen and IgM ELISA positive) with thrombocytopenia were subjected to assessment of PDW, PCT and MPV. **Results:** Out of 65 patients, 30 were males and 35 were females. The most predominant symptom was headache in 40 patients, body ache in 26, arthralgia in 21 patients, vomiting and diarrheain 41 and maculopapular rash in 15 cases.The difference was non- significant (P> 0.05). The mean platelet volume (MPV) was observed to be 9.02 fL. The mean platelet distribution width (PDW) was found to be 17.4%. The median plateletcrit (PCT) was observed to be 0.48. **Conclusion:** The platelet parameters of patients with thrombocytopenia and dengue fever did not differ, according to our investigation.
Key words: Dengue, thrombocytopenia, platelet volume

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INTRODUCTION

The dengue virus (DENV), a flavivirus spread by mosquitoes, is the cause of dengue, an acute fever sickness. Dengue etiology and pathophysiology are thought to be significantly influenced by host response.[1] The pathogenesis of severe dengue, including DHF and DSS, which are characterized by hemorrhagic symptoms and enhanced capillary permeability, is directly influenced by platelet function. In the meantime, the platelet count was found to be a prognostic sign of recovery and a predictor of severe dengue.[2]Researchers are increasingly examining the platelet indices—platelet crit (PCT), mean platelet volume (MPV), and platelet distribution width (PDW)—in a variety of clinical conditions. Nevertheless, little is known about platelet parameters in thrombocytopenia-afflicted dengue patients.[3]

The pathophysiology of dengue illness remains incompletely understood. It is believed that the host response has a significant impact on the pathophysiology and progression of dengue. A common symptom of DENV infection is leukopenia, which can also include thrombocytopenia in varying degrees.[4] Research has demonstrated that the presence of DENV causes both qualitative and quantitative changes in platelets. Platelet function has a direct impact on the pathophysiology of severe dengue, including DHF and DSS with hemorrhagic signs and increased capillary permeability.[5] The present study was conducted to evaluate utility of platelet parameters in serologically proven dengue cases.

MATERIALS & METHODS

The present study consisted of 65 laboratory confirmedpositive dengue cases (NS1 antigen and IgM ELISA positive) with thrombocytopenia of both genders.All enrolled patients gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. A careful examination was carried out. 5 ml of venous blood was collected in a test tube from all patients. The blood samples were run on automated analyzers within 2 hours of venipuncture in order to prevent an artefactual EDTA- induced platelet swelling. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 65		
Gender	Male	Female
Number	30	35

Table I shows that out of 65 patients, 30 were males and 35 were females.

Table II Assessment of clinical findings

Clinical findings	Number	P value
Headache	48	0.57
Body ache	26	
Arthralgia	21	
vomiting and diarrhea	41	
maculopapular rash	15	

Table II, graph I shows that the most predominant symptom was headache in 40 patients, body ache in 26, arthralgia in 21 patients, vomiting and diarrhea in 41 and maculopapular rash in 15 cases. The difference was non- significant (P> 0.05).
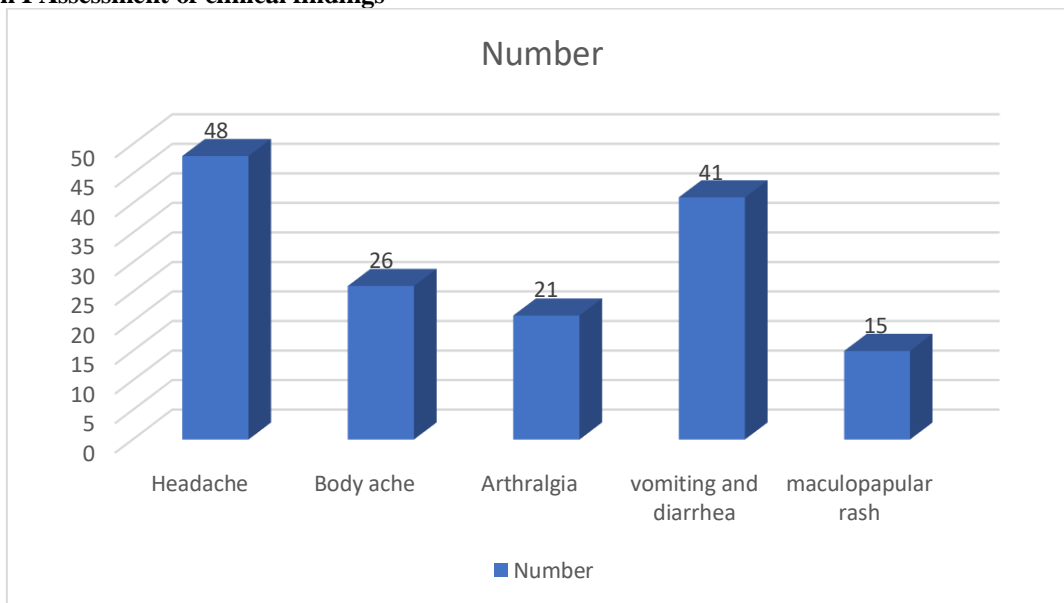
Graph I Assessment of clinical findings

Table III Assessment of platelet parameters

Platelet parameters	Mean
MPV (fL)	9.02
PDW (%)	17.4
PCT	0.48

Table III shows that the mean platelet volume (MPV) was observed to be 9.02fL. The mean platelet distribution width (PDW) was found to be 17.4%. The median plateletcrit (PCT) was observed to be 0.48.

DISCUSSION

The platelet count is a predictive indicator of recovery and a predictor of severe dengue. Researchers may now measure more recent parameters, such platelet indices, in addition to platelet count thanks to automation in hematology.[6] These platelet markers provide useful extra details about the maturity and shape of the platelets. Platelet indicators, including as platelet crit (PCT), mean platelet volume (MPV), and platelet distribution width (PDW), are being studied more and more in relation to a range of clinical conditions.[7] The laboratory-based reference ranges can be very useful in understanding the results and may prevent unnecessary, costly follow-ups if they are precise and well-defined.[8] The present study was conducted to evaluate utility of platelet parameters in serologically proven dengue cases.

We found that out of 65 patients, 30 were males and 35 were females. Chatterjee Net al[9] in their study found that the total number of patients were 180 of whom 92 (51.1%) were male and 88 (48.9%) were female. The maximum number of patients belonged to the age group 20-29 years (26.9%). The most common presentation apart from fever and bodyache were gastrointestinal symptoms. 42% patients complained of abdominal pain, 24% had vomiting, 9.6% diarrhoea. Bleeding manifestations occurred in 23% of patients. CNS features were documented 10.4%. Case fatality came out to be 3.8%. Investigations revealed thrombocytopenia in 55% and leucopenia 32.7%, transaminitis in 72% Evidence of organomegaly (22.2%) and serositis (42%) were detected. Complications included intracranial haemorrhage, DIC, pancreatitis, myocarditis and even a solitary case of splenic rupture.

We found that the most predominant symptom was headache in 40 patients, body ache in 26, arthralgia in 21 patients, vomiting and diarrhea in 41 and

maculopapular rash in 15 cases.Kulkarni et al[10]evaluated the association of platelet counts against NS1 and IgM/IgG in dengue infections. Of 2104 samples tested, 320 were positive for one or more dengue parameters. Of the 320, 95 were positive for NS1 only, 161 showed IgM only while 9 showed IgG only. More than one marker was detected in the remaining 55 samples. Thrombocytopenia was more consistently associated whenever NS1 was detected compared to antibody detection.

We found that the mean platelet volume (MPV) was observed to be 9.02 fL.

The mean platelet distribution width (PDW) was found to be 17.4%. The median plateletcrit (PCT) was observed to be 0.48.Saito et al[11]in their study the relationship between the PAIgG or PAIgM levels and disease severity as well as thrombocytopenia was examined in 78 patients with acute phase secondary infection in a prospective hospital-based study. The decrease in platelet counts during the acute phase recovered significantly during the convalescent phase. In contrast, the increased levels of PAIgG or PAIgM that occurred during the acute phase of these patients decreased significantly during the convalescent phase. An inverse correlation between platelet counts and PAIgG or PAIgM levels was found in these patients. Anti-dengue virus IgG and IgM activity was found in platelet eluates from 10 patients in an acute phase of secondary infection. Increased levels of PAIgG or PAIgM were significantly higher in DHF than those in dengue fever (DF). An increased level of PAIgM was associated independently with the development of DHF, representing a possible predictor of DHF with a high specificity.

Lolekha Ret al[12]in their study found that of the 40 patients enrolled, 31 were diagnosed as dengue infection and confirmed by either serology or viral isolation. Of these, 12 had primary infection and 19 had secondary infection. Dengue fever occurred in 9 cases. Dengue viruses were isolated from 28 out of 31 patients, and dengue hemorrhagic fever was diagnosed in 22 patients. Viral serotypes identified by viral isolation, and RT-PCR were concordant: DEN1 was isolated in 8, DEN2 in 13, DEN3 in 5, and DEN4 in 2 patients. Viral isolation yielded positive results on blood collected before the 5th day of fever. MI was more sensitive than TC. RT-PCR was less sensitive than viral isolation during the early days of fever, but became more sensitive after the 5th day of fever. RT-PCR was able to detect virus up to day 7-8 of fever, even after defervescence, and in the presence of antibody. During the febrile stage, serological diagnosis on blood samples taken 48 hours apart was carried out by HI, IH-ELISA, and MRL-ELISA, facilitating diagnosis in 3 (10%), 21 (67%), and 27 (87%) of patients, respectively. All of the patients with secondary infection were diagnosed by MRL-ELISA before defervescence. By the 8th day of fever, a serological diagnosis aided to diagnose in 9 (29%), 29 (93%), and 31 (100%) of patients by HI, IH-ELISA, and MRL-ELISA, respectively.

The limitation of the study is small sample size.

CONCLUSION
The platelet parameters of patients with thrombocytopenia and dengue fever did not differ, according to our investigation.

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