Assessment of Hematological Profile of Dengue Patients

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ABSTRACT:
Background: Dengue is caused by one of the four serotypes of the dengue virus. The present study was conducted to assess hematological profile of dengue patients.
Materials & Methods:60 patients of dengue fever of both genders were included. Serological profiling of dengue for NS-1 AG was performed by dengue NS-1 kit. Test results were interpreted at 15-20 minutes. If the patient is affected by dengue virus, a purple color moves across the result window in the center of the test device.
Results: Out of 65 patients, males were 25 and females were 35. Platelet cell count/µl <50000 was seen in 14, 50000-100000 in 26, 100000-150000 in 12 and >150000 in 7patients. White blood cell count/µl 2500 was seen in 2, 2500-3500 in 13, 3500-4500 in 20 and 4500-5500 in 25.
Conclusion: Most of dengue fever patients had low platelet and white blood cell count. Altered haematological profile is indicators of dengue fever.
Key words: Arbovirus, dengue fever, haemorrhagic fever.

Introduction

Dengue is caused by one of the four serotypes of the dengue virus (DEN-1, DEN-2, DEN-3 and DEN-4) also referred to as an arbovirus (arthropod-borne viruses) that belongs to the genus Flavivirus of the family Flaviviridae.[1] It is a disease with a wide clinical spectrum and a wide variety of presentations, ranging from asymptomatic to an undifferentiated fever (viral syndrome) to the more severe forms such as severe dengue or Dengue haemorrhagic fever (DHF). Transmission to humans occurs by the bite of the female Aedes aegypti mosquito infected by one of four serotypes of the virus. This mosquito, a domestic species adapted to urban conditions, is the main vector.[2]

For an accurate diagnosis, specific laboratory tests are necessary. Serological, costly molecular methods (RT-PCR) and laborious virus isolation are performed to diagnose the specific dengue fever. For detecting dengue, the NS1 antigen (NS1 Ag) test is one of the most regular tests in clinical practice.[3] For viral translation, transcription, and replication, non-structural proteins are involved. The NS1 protein antigen is involved in viral RNA replication among these proteins. Without forming part of the virion, NS1 is expressed on the surface of infected cells.[4] Secreted NS1 serum level positively correlates with viral titres and are tremendous ways in dengue diagnosis. For promoting the early diagnosis of dengue, thrombocytopenia and leukopenia serve as a predictive marker. The platelet count is the only accessory laboratory test which can support diagnosis of DHF or DSS.[5] The present study was conducted to assess hematological profile of dengue patients.

Materials & Methods

The present study comprised of 60 patients of dengue fever of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. 5 ml of venous blood samples were aseptically collected in gel vacuities. The blood serum was properly separated by centrifugation at 1000 g for 5 min. Serological profiling of dengue for NS-1 AG was performed by dengue NS-1 kit. Test results were interpreted at 15-20 minutes. If the patient is affected by dengue virus, a purple color moves across the result window in the center of the test device. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I Distribution of patients

Total- 60		
Gender	**Male**	**Female**
Number	25	35

Table I shows that out of 65 patients, males were 25 and females were 35.

Table II Dengue infection according to platelet cell count

Platelet cell count/µl	Number	P value
<50000	14	0.05
50000-100000	26	
100000-150000	12	
>150000	7	

Table II, graph I shows that platelet cell count/µl <50000 was seen in 14, 50000-100000 in 26, 100000-150000 in 12 and >150000 in 7patients. The difference was significant (P< 0.05).

Graph IDengue infection according to platelet cell count

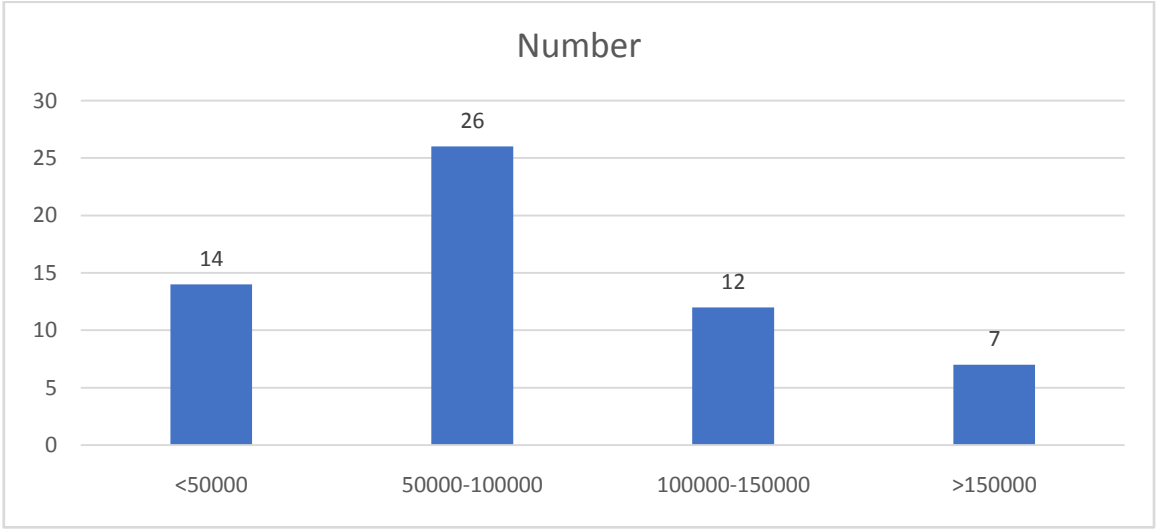
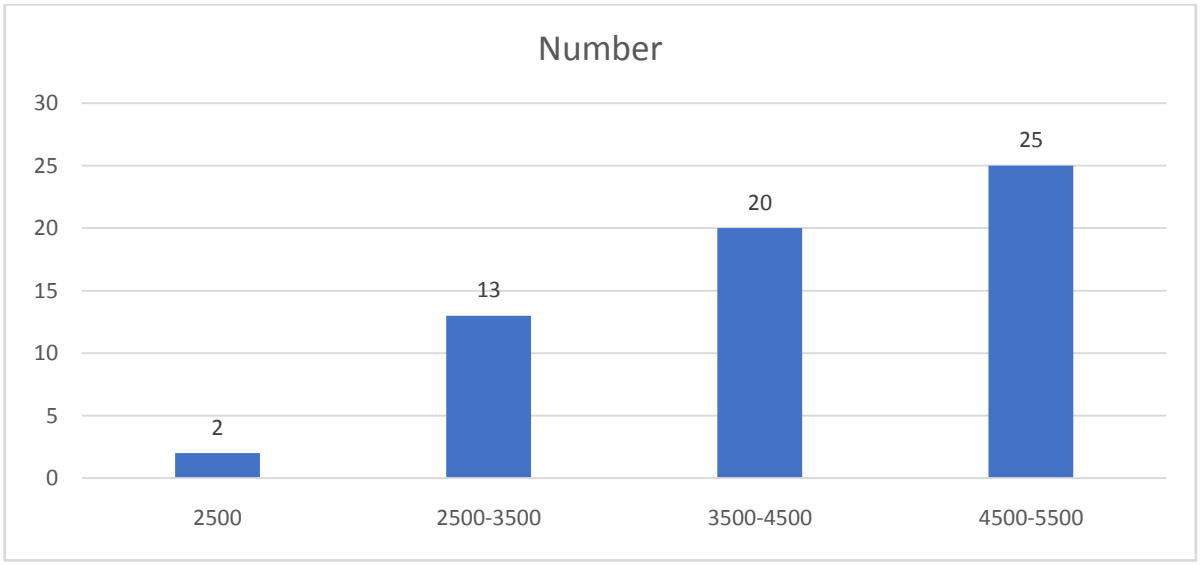


Table III Dengue infection according to white blood cell count

White blood cell count/µl	Number	P value
2500	2	0.01
2500-3500	13	
3500-4500	20	
4500-5500	25	

Table III, graph II shows that white blood cell count/µl 2500 was seen in 2, 2500-3500 in 13, 3500-4500 in 20 and 4500-5500 in 25.The difference was significant (P< 0.05).

Graph IIDengue infection according to white blood cell count



Discussion

The diagnosis of dengue fever is carried out based on clinical, epidemiological and laboratory data.[6] Among laboratory tests, both non-specific [blood count, platelet count, tourniquet test, prothrombin time (PT), activated partial thromboplastin time (APTT), liver function tests and serum albumin concentration] and specific tests (viral isolation tests and serology for antibody examination) are used. Leukopenia is the most prominent hematological change, sometimes with counts of less than 2 x 103 /µL.[7] However, there are reports of mild leukocytosis at the onset of the disease, with neutrophilia. Lymphocytosis is a common finding, with the presence of atypical lymphocytes.[8] The hematocrit concentration should be monitored according to the days of illness, remembering that, with the progression to DHF, there will be a 20% increase in hematocrit from the patient's baseline, associated with thrombocytopenia (< 100 x 10^9 /L).[9] The present study was conducted to assess hematological profile of dengue patients.

In present study, out of 65 patients, males were 25 and females were 35. Azin et al[10] included 154 patients with clinical and serological diagnoses of dengue fever were allocated to two groups according to age: under 15 years old (n = 66) and 15 years or older (n = 88). The tests analyzed were blood count, platelet count, and serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) concentrations. Thrombocytopenia and elevated transaminases were observed in patients with classic dengue fever. The main laboratory

abnormalities found in dengue hemorrhagic fever were thrombocytopenia, hemoconcentration and elevated transaminases, similar to severe dengue with the exception of hemoconcentration. Most laboratory abnormalities started on the 3rd day but were more evident on the 5th day with restoration of values by the 11th day; this was more prominent in under 15-year-olds and with the more severe clinical forms.

We observed that platelet cell count/µl <50000 was seen in 14, 50000-100000 in 26, 100000-150000 in 12 and >150000 in 7patients. White blood cell count/µl 2500 was seen in 2, 2500-3500 in 13, 3500-4500 in 20 and 4500-5500 in 25. Chaloemwong J et al[11] in their study one hundred and fifty-four dengue and 146 control patients were included. Headache, nausea, loss of appetite and bleeding diathesis were significantly symptoms in dengue patients ($p < 0.05$). There was some diversity in the the CBC in the dengue patients compared to the control group. Moreover, this study also identified the day of fever which these parameters were statistically significant. The dengue group had higher hemoglobin and hematocrit from day 3 to day 10 ($p < 0.001$), lower white blood cell count from day 1 to day 10 ($p < 0.001$), lower platelet count from day 3 to day 10 ($p < 0.001$), higher monocyte on day 1–4 ($p < 0.001$), higher atypical lymphocyte percentage on day 5–9 ($p < 0.001$) and higher eosinophil percentage on day 9–10 ($p = 0.001$). Furthermore, the neutrophil to lymphocyte percentage ratio of dengue group was > 1 on the first 5 days then reversed on day 6 to Day 9 but in non-dengue group, the ratio was always > 1.

Abedin et al[12]in their study 67samples were diagnosed as positive. Seroprevalence of dengue was 26.30%. Out of 67 positive dengue patients, 41 (61.2 %) were male and 26 (38.8 %) were female. Dengue infection was observed more in 21 to 30years age group followed by above 40years and 16 to 20years but observed less in of 1st day to 5years followed by 11 - 15years, then 6 -10years and 31 - 40years. It was seen that the >40years of age group had the maximum unit of cases having low platelet count followed by 21-30years and it was also seen that 21-30years of age group had the maximum range of cases having low WBC count followed by above 40years of age group. In our research, we showed thrombocytopenia (100000 - 150,000/µl) with leucopenia (White Blood Cells, WBC < 5000/µl) in 5(16.7%) cases and thrombocytopenia.

Conclusion

Authors found that most of dengue fever patients had low platelet and white blood cell count. Altered haematological profile is indicators of dengue fever.

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