ORIGINAL RESEARCH PAPER
Volume - 12 | Issue - 04 | April - 2023 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A STUDY OF HEMATOLOGICAL CHANGES IN DENGUE PATIENTS.

Pathology

Dr. Arundhati Vaid Postgraduate Student, Department of Pathology, GMC Jammu.

Dr. Ayushi Sharma Post Graduate Student, Department of Pathology, GMC, Jammu.

Dr. Suman Kumari Post Graduate Student, Department of Pathology, GMC, Jammu.

Dr. Subhash Bhardwaj Professor and Head, Department of Pathology, GMC Jammu.

Dr. Silvi Sandhu* Postgraduate Student, Department of Pathology, Government Medical College, Jammu
*Corresponding Author

ABSTRACT

Background: Dengue fever is a mosquito-borne acute illness, which is a major global health problem in the subtropics as well as the tropics worldwide. It is a viral infection caused by the dengue virus (DENV) and transmitted to humans by the Aedes mosquito vector. The aim of the present study was to analyze the hematological changes in patients with dengue fever having serological confirmation. **Methodology:** The retrospective study was conducted at Government Medical College, Jammu over a period of one year, during the dengue outbreak. Total 150 cases were taken which were seropositive (Dengue NS1 antigen and IgG and IgM antibodies). A brief clinical history along with hematological and biochemical investigations were recorded and analyzed with the help of SPSS 22.0 version. **Results:** It was observed in the study that most of the patients (62.6%) were under 28 years of age and dengue illness was more common in men than in women. Further, 24% of the subjects reported leukopenia, 40% of the patients reported hemoconcentration, almost 50% of the patients had thrombocytopenia. **Conclusion:** The study concluded that the dengue illness is more common in young men and hemogram is the most important guide for early detection of dengue and also can give a clue to the severity of dengue infection.

KEYWORDS

Dengue, Fever, Hematological parameters, Platelet count

INTRODUCTION

Dengue fever is a mosquito-borne acute illness, which is a major global health problem in the subtropics as well as the tropics worldwide [1]. This viral infectious disease is caused by the dengue virus (DENV) and transmitted to humans by the Aedes mosquito vector.

In 1956 first dengue fever was reported in Vellore and the first dengue hemorrhagic fever was found in Calcutta in 1963.[2] It was observed that the annual incidence of dengue is 7.5 to 32.5 million in India and all the four serotypes i.e. Dengue 1, 2, 3 and 4 have been isolated.[3]

The rapid onset of high fever, headache, retroorbital pain, diffuse body pain (both muscle and bone), weakness, vomiting, sore throat, altered taste sensation, and a centrifugal maculopapular rash are the manifestations of classic dengue fever.[4]

The dengue fever is manifested by four main characteristics, i.e. continuous high fever lasting 2-7days, haemorrhagic tendency as shown by a positive tourniquet test, epistaxis, thrombocytopenia (platelet count <100X10 ^{9}/l) and evidence of plasma leakage manifested by haemoconcentration (an increase in haematocrit 20% above average for age, sex and population), pleural effusion and ascites, etc. [5,6].

Dengue is diagnosed by detection of viral genomic sequence by reverse transcription polymerase chain reaction (RT-PCR) and detection of NS1 antigen.[7,8,9,10] Platelet count is the most important haematological marker in the diagnosis of dengue.[8, 10, 11] The other hematology parameters like total white cell count and atypical lymphocyte count aid in diagnosis and prognosis in dengue.[12,13,14]

AIMS/ OBJECTIVES OF STUDY

To study the hematological changes in patients with dengue fever having serological confirmation.

MATERIAL AND METHODS

The present retrospective study was conducted at Government Medical College, Jammu over a period of one year from 01.11.2021 to 31.10.2022 during the dengue outbreak. Total 150 cases were taken which were seropositive (Dengue NS1 antigen and IgG and IgM antibodies). A brief clinical history along with haematological and biochemical investigations were evaluated.

Inclusion Criteria

- All patients admitted in emergency medicine ward and inpatient ward of Government Medical College and Hospital with confirmed diagnosis of dengue (NS1 Ag and /or Ig M positivity)

Exclusion Criteria

- Patients with clinical presentation of fever but negative for dengue serology were excluded from the study.

Hemogram was done on automated cell counter analyzer which included haemoglobin, hematocrit, Total leucocyte count (TLC), Differential leucocyte count (DLC) and platelets count. Platelets counts were cross checked on stained smears. Hematocrit raised >20% of normal was considered as hemoconcentration. Leukopenia was taken as total leucocyte count < 4,000 /mm^3. Thrombocytopenia was taken as platelets count < 1,00,000 /mm^3. Information about patients obtained from proformas were taken and tabulated in excel sheet and findings were compared with similar studies. The data was recorded in Microsoft Excel and analyzed with the help of SPSS 22.0 version.

OBSERVATIONS AND RESULTS

Table 1: Age Distribution

Age (Years)	Frequency	Percent
Up to 18	44	29.3
19 to 28	50	33.3
29 to 38	36	24.0
39 to 48	10	6.6
49 to 58	06	4.0
> 58	04	2.6
Total	150	100

Table 1 showed that the most of the patients (62.6%) were under 28 years of age. There were 33.3% in the age group 19-28 years and 29.3% patients under 18 years of age. Patients above 58 years of age comprises 2.6 % of the study population.

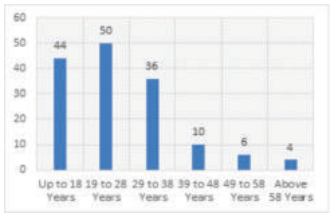

Figure 1: Age Distribution

Table 2: Gender Distribution

SEX	Frequency	Percent
Male	119	79.3%
Female	31	20.6%
Total	150	100.0

Table 2 depicts that the incidence of dengue illness is more common in men than in women. In our study there were 79.3% males and 20.6% females.

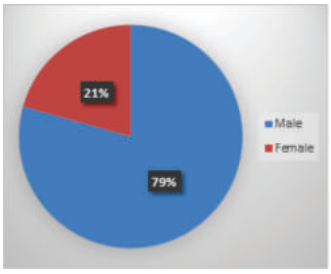

Figure 2: Sex Distribution

Table 3: Total Leukocytes count

Total count	Frequency	Percent
<4000	36	24.0%
>=4000	114	76.0%
Total	150	100.0

In our study the investigations of patients revealed that 24% of the subjects had leukopenia with total leukocytes count of less than 4000 on admission.

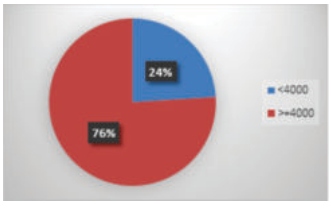

Figure 3: Total Leukocytes Count

Table 4: Distribution Of Patients As Per Hb (gm%)

Hb (gm %)	Frequency	Percent
<10	25	16.6
10-12	35	23.3
12-15	60	40.0
>15	30	20.0
Total	150	100.0

Table 4 depicts the distribution of patients as per Hb (gm%). In our study most (40%) of the patients had Hb (gm%) between 12-15 whereas only 16.6% patients had Hb (gm%) value less than 10.

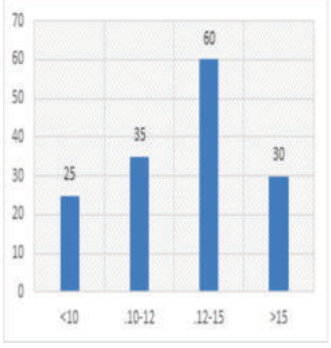

Figure 4: Distribution Of Patients As Per Hb (gm%)

Table 5: Platelet Count

Platelet group	Frequency	Percent
<50000	77	51.3
>=50000	73	48.6
Total	150	100.0

Table 5 depicts that around half of the patients had thrombocytopenia of < 50,000/cu.mm of platelets. This also coincides with the high incidence of thrombocytopenia in dengue patients.

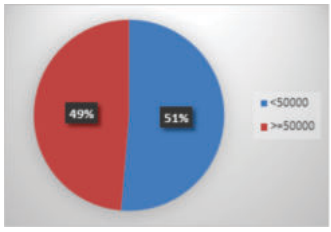

Figure 5: Platelet Count

Table 6: Distribution Of Patients As Per PCV/ Haematocrit

Packed cell volume	Frequency	Percent
<45	132	88.0
>=45	18	12.0
Total	150	100.0

Table 6 depicts that on admission, nearly 12% had hematocrit of more than 45.

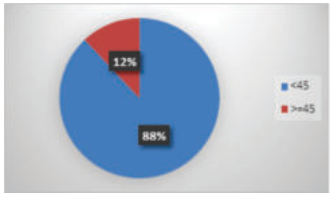

Figure 6: PCV/ Haematocrit

DISCUSSION

A range of findings in peripheral blood is seen mostly during dengue viral infections. Heamo-concentration and raised hematocrit are well known findings in patient of Dengue haemorrhagic fever [15].

In this study most of the patients (62.6%) were under 28 years of age. There were 33.3% in the age group 19-28 years and 29.3% patients under 18 years of age. Further, the incidence of Dengue illness is more common in men than in women. In our study there were 79.3% males and 20.6% females. Most of these patients were adults because they form the working age group and therefore more exposure to insect bites. In a study done by Ahmed AB et al mean age of the cases was 29.39+ SD10.59 years (range 15 to 69) and almost half of the patients (49%) were in age group of 21-30 years, closely followed by age group of 31-40 years (18.86%) [16] which was similar to our study.

Further, in India females are usually better clothed than males, hence they are less exposed. In studies done by Yaseen et al and Shekar et al male to female ratio was 1.4:1 and 1.13:1 respectively [17,18] which was similar to our study.

In our study the investigations of patients revealed that 24% of the subjects had leukopenia with total leukocytes count of less than 4000 on admission. Leukopenia was also observed in other studies by Avarebeel et al.[19] and Ratageri et al.[20].

In our study around half of the patients had thrombocytopenia of < 50,000/cu.mm of platelets. This also coincides with the high incidence of thrombocytopenia in dengue patients which was similar to the studies by Avarebeel et al.[19] and Ratageri et al.[20]

In our study most (40%) of the patients had Hb (gm%) between 12-15 whereas only 16.6% patients had Hb (gm%) value less than 10. Study carried out by Achalkar [21] showed hemoconcentration in more than 50% of the patients.

In our study it was found during admission that nearly 12% had haematocrit of more than 45. It was also seen in the studies by Basak and Talukder [22].

CONCLUSION

Dengue infection is increasing due to unplanned urbanization & compromised sanitation measures. The Present study concludes that the dengue is more common in young men and hemogram is the most important guide for early detection of dengue and also can give a clue to the severity of dengue infection. Further, Platelet count, TLC, Hemoglobin and PCV levels if rightly and timely assessed, these can be of value for better care of dengue patients.

REFERENCES

1. Messina, J.P.; Brady, O.J.; Golding, N.; Kraemer, M.U.G.; Wint, G.R.W.; Ray, S.E.; Pigott, D.M.; Shearer, F.M.; Johnson, K.; Earl, L.; et al. The current and future global distribution and population at risk of dengue. Nat. Microbiol. 2019, 4, 1508–1515.
2. Special Programme for Research. Dengue: Guidelines for Diagnosis, Treatment, Prevention and Control2009World Health OrganizationGeneva, Switzerland.
3. N Gupta S Srivastava A Jain U C Chaturvedi Dengue in India Indian J Med Res2012136337390
4. Deshwal R, Qureshi MI, Singh R. Clinical and Laboratory Profile of Dengue Fever. Journal of The Association of Physicians of India. December 2015, Vol 63: 30-32.
5. Whitehorn J, Farrar J. Dengue. Br Med Bull. 2010; 95:161–173.
6. Dengue: Guidelines for diagnosis, treatment, prevention, and control in sub-Saharan Africa and 13 countries in South America. Geneva: World Health Organization; 2009.
7. V Sindhamni S Banoo N Rajkumar V C Sureshchandra Evaluation of correlation between dengue serological marker and platelet countSch J App Med Sci201642661822
8. Basavaraj C Metri Parameswarappa Jyothi Correlation of serological markers and platelet count in the diagnosis of Dengue virus infectionAdv Biomed Res20154126
9. M T Cordeiro Laboratory diagnosis for dengueRev Inst Med trop S Paulo201254181012
10. K D Mehta B Ghediya S Sheth S Khandhediya H Shingala M Sinha Study of Correlation Between Platelet Count and Serological Markers of Dengue Infection with Importance of NS1 Antigen in Western Region of IndiaNatl J Lab Med201652559.
11. R D Kulkarni G S Ajantha A S Kalabhavi P C Shetty S S Patil A K Upadhya Association of platelet count and serological markers of dengue infection- importance of NS1 antigenIndian J Med Microbiol201129435962.
12. K Jayashree G C Manasa P Pallavi G V Manjunath Evaluation of Platelets as Predictive Parameters in Dengue FeverIndian J Hematol Blood Transfus201127312730
13. K Khatri A Rajani R Kallaa Plasmacytoid Lymphocytes: A Diagnostic clue to Dengue InfectionInt J Sci Res20165310025
14. G Dhir T Dhir V Suri D Dhir K Khatri Hematological and Serological Test Profile in Dengue, Dengue Hemorrhagic Fever and Dengue Shock Syndrome in Bathinda Region of PunjabSch J App Med Sci201538C29262956.
15. Itoda I, Masuda G, Suganuma A, Imamura A, Ajisawa A,Yamada K, et al. Clinical features of 62 imported cases of dengue fever in Japan. Am J Trop Med Hyg 2006; 75:470–4.
16. Ahmed AB, Bhattacharyya DK, Baruah S, Brahma B and Bharadwaj R. Clinical and Laboratory Profile of Dengue Fever. Int J Med Res Prof.2017; 3: 113-116.
17. Yaseen M, Khan SA. Evaluation of ClinicoHematological and Biochemical Changes in Dengue Fever at CIMSH Lucknow. International Journal of Contemporary Medical Research. July 2017; 4:1527- 1529. 10.
18. Shekar GC,Amaravadi A. Clinical, Biochemical and Hematological Profile in Dengue Fever. International Journal of Scientific Study. 2016; 4:144-148.
19. Avarebeel S, Prahlad KA, Tabassum L. Study of clinical and demographic profile of dengue fever. J Evidence Based Med Healthcare 2014;1(4):211–30.
20. Ratageri VH1, Shepur TA, Wari PK, Chavan SC, Mujahid IB, Yergolkar PN. Clinical profile and outcome of dengue fever cases. Ind J of Pediatr 2005;72(8):705–6.
21. Achalkar GV. Dengue: a clinic-pathological study of 50 cases. J Evol Med Den Sci 2013;2(48):9380–5.
22. Basak TB, Talukder SI. Clinical profile of dengue infection. Dinajpur Med Col 2014;7(1):37–41.