ORIGINAL RESEARCH

Evaluation Of Role Of Clinicohaematological Profile In Diagnosis Of Dengue At A Tertiary Care Hospital

[1]Dr. Amrta Tiwari, [2]Dr. Nidhish Kumar, [3]Dr. Binod Kumar Ravi, [4]Dr. Mayank Shukla

[1]Associate Professor, [2]Assistant Professor, Department of Pathology, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh, India
[3]Assistant Professor, Department of Forensic Medicine and Toxicology, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh, India
[4]Professor, Department of Orthopaedics, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh, India

Corresponding author
Dr. Mayank Shukla,
Professor, Department of Orthopaedics, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh, India
Email: drmks73@gmail.com

ABSTRACT
Background: Dengue is the most common arthropod borne viral illness in humans, transmitted by mosquitoes of the genus Aedes. The present study was conducted to evaluate role of clinicohaematological profile in diagnosis of dengue at a tertiary care hospital.
Materials & Methods: The present study was conducted at Department of Pathology, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh (India) over a period of 06 months. Clinical examinations were performed by a physician on each study participant. The diagnosis of dengue was made. All the routine investigations such as hematological determination was determined. Data were entered and analyzed using the SPSS 20.0 statistical software. Data were presented by using tables and figure.
Results: In the present study total participants were 450 in which 55.55% were males and 44.44% were females. Maximum patients suffering from dengue were of age group 18-30 yrs (40%). Clinical features show that fever was present in maximum patients (96%) followed by body ache (95.11%) and Retro-orbital pain (72.44%). Dehydration was absent in 46.66% patients. 1.77% of patients had severe dehydration and 1.55% patients were in shock. Mortality occurs in 3 cases. The most common hematological finding observed was thrombocytopenia (platelet count < 140,000/cumm) in 57.77%, followed by anemia (hemoglobin level < 11.5 g/dl) in 46.66% and leucopenia (total leukocyte count < 4,000/cumm) in 26.66% the cases. Hematocrit > 44% were noted in 11.11% of the cases. Neutrophil < 1500 in 13.33% and lymphocyte > 2900 in 4.44% of the cases. Autopsy findings of 3 cases shows serous effusions, pulmonary oedema, mucosal congestion of GIT, visceral congestion, hepatomegaly, cerebral oedema.
Conclusion: The study concluded that fever was present in most patients. Dehydration was absent in 46.66% patients. 1.77% patients had severe dehydration and 1.55% patients were in shock. The most common hematological finding observed was thrombocytopenia followed by anemia and leucopenia.

Keywords: Dengue, Hematological, Clinical, Platelet Count.

INTRODUCTION

Dengue is an acute, rapidly spreading, self-limited disease (typically lasting 5–7 days), characterized by fever, prostration, headache, myalgia, rash, lymphadenopathy, and leukopenia, and caused by four antigenically related, but distinct types of dengue viruses transmitted by the bite of infected mosquitoes of the genus Aedes, especially Aedes aegypti, Aedes albopictus, and Aedes polynesiensis. It occurs epidemically and sporadically in India, Japan, West Africa, and Southeast Asia.[1] The WHO estimates, more than 2.5 billion individuals live at risk of dengue transmission in more than 100 countries and approximately 50-100 million individuals have infected with dengue annually.[2] India is one of the seven identified countries in the South-East Asia region regularly reporting the incidence of dengue fever outbreaks and may soon transform into a major niche for dengue infection in the near future.[3] Its diagnosis is based on clinical and laboratory data. Clinical symptoms and signs along with laboratory tests i.e. both non-specific [blood count, platelet count, prothrombin time (PT) and liver function tests] and specific tests (viral isolation tests and serology for antibody examination) are evaluated for diagnosis.[4,5] The most prominent hematological change is thrombocytopenia and leukopenia. Lymphocytosis is commonly noted with reactive lymphocytes. There is progressive increase in hematocrit concentration during the progression of dengue fever almost upto 20% increase from the patient's baseline.[6,7] The present study was conducted to evaluate role of clinicohaematological profile in diagnosis of dengue at a tertiary care hospital.

MATERIALS & METHODS

The present study was conducted at Department of Pathology, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh (India) over a period of 06 months. Institutional ethical committee clearance was obtained and written informed consent was taken from all patients. Patients presenting to the emergency department, outpatient department (OPD) with complaints of fever and clinical features of dengue were included in the study. Cases confirmed as malaria, Kala-azar, typhoid fever, and any other confirmed chronic diseases were excluded in the study. Clinical examinations were performed by a physician on each study participant. Demographic variables, and clinical profiles of study participants were collected. The diagnosis of dengue was made based on positive enzyme-linked immunosorbent assay (ELISA) result for specific IgM antibody for dengue in serum. All the routine investigations such as hematological determination like total leukocyte count (TLC), differential leukocyte count, platelet count; hemoglobin (Hgb) and hematocrit (Hct) were determined by the automated blood analyzer. Patients were treated with oral rehydration therapy, intravenous (IV) fluid therapy, packed red blood cell (PRBC) transfusion, platelet concentrates depending upon the clinical condition. Patients were discharged once there were no signs of dehydration, adequate urine output and platelet count > 50,000 cu/mm. Oxygen therapy by face mask was given wherever it was necessary. If any mortality occurs Autopsy was conducted. Thorough external and I nsitu examination of the body and detailed gross findings of the different organs was done. Data were entered and analyzed using the SPSS 20.0 statistical software. Data were presented by using tables and figure.

RESULTS

In the present study total participants were 450 in which 55.55% were males and 44.44% were females. Maximum patients suffering from dengue were of age group 18-30 yrs (40%). Clinical features shows that fever was present in maximum patients (96%) followed by body ache (95.11%) and Retro-orbital pain (72.44%). Dehydration was absent in 46.66% patients. 1.77% patients had severe dehydration and 1.55% patients were in shock. Mortality occurs in

3 cases. The most common hematological finding observed was thrombocytopenia (platelet count < 140,000/cumm) in 57.77%, followed by anemia (hemoglobin level < 11.5 g/dl) in 46.66% and leucopenia (total leukocyte count < 4,000/cumm) in 26.66% the cases. Hematocrit > 44% were noted in 11.11% of the cases. Neutrophil < 1500 in 13.33% and lymphocyte > 2900 in 4.44% of the cases. Autopsy findings of 3 cases show serous effusions, pulmonary oedema, mucosal congestion of GIT, visceral congestion, hepatomegaly, cerebral oedema.

Table 1: Demographic characteristics

Variable	N(%)
Gender	
Male	250(55.55%)
Female	200(44.44%)
Age group(years)	
18-30	180(40%)
31-40	150(33.33%)
41-50	59(13.11%)
Above 50	61(13.55%)

Table 2: Clinical characteristics

Clinical features	N (%)
Fever	432(96%)
Bodyache	428(95.11%)
Headache	253(56.22%)
Retro-orbital pain	326(72.44%)
Abdominal pain	63(14%)
Loose stools	72(16%)
Vomiting	49(10.88%)
Skin rash	264(58.66%)
Breathlessness	9(2%)
Bleeding manifestations	42(9.33%)
Dehydration at presentation	
No dehydration	210(46.66%)
Mild	180(40%)
Moderate	45(10%)
Severe	8(1.77%)
Shock	7(1.55%)

Table 3: Hematological parameters of dengue cases at the time of hospital visit

Hematological test	N (%)	Normal value
Platelet count (cells/cumm)		140,000-415,000/cumm
< 140,000	260(57.77%)	
≥140,000	190(42.22%)	
WBC count (cells/cumm)		4,000-10,500/cumm
< 4,000	120(26.66%)	
≥ 4,000	330(73.33%)	
Hemoglobin g/dl		
Male ≤ 13	108(24%)	M: 13-16
Female ≤ 12	102(22.66%)	F: 12-15
Sub-total 45 (44.1)	210(46.66%)	

Hematocrit (%)		
Male > 46	40(8.88%)	M: 38-46
Female > 44	10(2.22%)	F: 35-44
Sub-total	50(11.11%)	
Neutrophil (cells/cumm)		1500-8000
< 1500	60(13.33%)	
≥ 1500	390(86.66%)	
Lymphocyte (cells/cumm)		900-2900
≤ 2900	430(95.55%)	
> 2900	20(4.44%)	

Table 4: Autopsy findings

	Antemortem findings	Investigations	Autopsy gross findings
N=3(0.66%)	Fever	Positive dengue serology	Serous effusions, Pulmonary oedema, Mucosal congestion of GIT, visceral congestion, hepatomegaly, cerebral oedema

DISCUSSION

Dengue fever is a major public health problem causing significant morbidity and mortality in the general population, especially in tropical and subtropical countries. The clinical profile of patients with DF varies from mild fever to severe organ impairment and blood loss.[8]

In the present study total participants were 450 in which 55.55% were males and 44.44% were females. Maximum patients suffering from dengue were of age group 18-30 yrs (40%). Clinical features shows that fever was present in maximum patients (96%) followed by body ache (95.11%) and Retro-orbital pain (72.44%). Dehydration was absent in 46.66% patients. 1.77% patients had severe dehydration and 1.55% patients were in shock. Mortality occurs in 3 cases. The most common hematological finding observed was thrombocytopenia (platelet count < 140,000/cumm) in 57.77%, followed by anemia (hemoglobin level < 11.5 g/dl) in 46.66% and leucopenia (total leukocyte count < 4,000/cumm) in 26.66% the cases. Hematocrit > 44% were noted in 11.11% of the cases. Neutrophil < 1500 in 13.33% and lymphocyte > 2900 in 4.44% of the cases. Autopsy findings of 3 cases shows serous effusions, pulmonary oedema, mucosal congestion of GIT, visceral congestion, hepatomegaly, cerebral oedema.

Tewari K. et al did a study among 443 adults and 57 children between 6 months to 77 year age. NS1 was positive in 115 patients (23%). Fever (99.8%) and severe body ache (97.4%) were the commonest presentation. DF was seen in 429 (85.8 %), DFWS in 55 (11%), SD with severe bleeding in 10 (2%) and SD with severe plasma leakage in 6 cases (1.2%). Outpatient department (OPD) treatment was needed in 412 (82%) and hospitalization in 88 (18%). Intravenous fluid resuscitation was needed in 16 (3.2%) patients. Thrombocytopenia was seen in 335 (67%) patients at presentation. Platelet transfusion was needed in 46 (9.2%). Packed red blood cell (PRBC) transfusion was given in 3 patients with DFWS and 10 of SD with severe bleeding. Death occurred in 3 patients of SD with severe plasma leak and 2 patients with SD and severe bleeding.[9]

Karmakar S et al found that 104 cases (49.5 %) were in the 2nd decade of life, which was the most common age group. There were 115 (54.7 %) males and 95 (45.2%) females. The most common presenting complaint was fever (185 cases). 98 cases (46.6%) were noted with hemoglobin ranging from 12-15 gm/dl and with hematocrit levels ranging from 40-49%. 128

cases (60.9 %) had TLC within normal limit. Maximum number of patients i.e. 87 cases (41.4 %) had platelet count with moderate thrombocytopenia. In DHF and DSS cases, 18 (72%) cases showed moderate thrombocytopenia. According to bleeding manifestations, petechiae was noted in 18 cases, hematemesis in 8 cases whereas 3 cases presented with melena. MPV and PDW in thrombocytopenic patients was found to be significantly higher than in non-thrombocytopenic patients.[10]

Virgin Joena et al found that Fever was present in all the cases with an average duration of 4.86 ± 1.59 days followed by myalgia (57.39%), vomiting (46.96%), headache (30.43%) and abdominal pain (20%). Bleeding and hepatic complication was presented by 22.16% and 50.43%. The mean platelet recovery duration was 8.42 ± 1.74 days. A strong positive correlation between day of recovery (increasing trend of platelet) from the onset of fever and WBC recovery was observed.[11]

CONCLUSION

The study concluded that fever was present in maximum patients. Dehydration was absent in 46.66% patients. 1.77% patients had severe dehydration and 1.55% patients were in shock. The most common hematological finding observed was thrombocytopenia followed by anemia and leucopenia.

REFERENCES

1. Dorland WA, editor. Dorland's Illustrated Medical Dictionary. 30th ed. Philadelphia, PA: Elsevier Saunders; 2003.
2. WHO. dengue and severe dengue. Fact sheet N 117 [cited 2018]. available from: http://www.searo.who.int/thailand/factsheets/fs0008/en/.
3. Kumar A, Rao CR, Pandit V, Shetty S, Bammigatti C, Samarasinghe CM. Clinical manifestations and trend of dengue cases admitted in a tertiary care hospital, udupi district, karnataka. Indian J Community Med. 2010;35:386-90
4. De Paula SO, Fonseca BA. Dengue: A review of the laboratory tests a clinician must know to achieve a correct diagnosis. Braz J Infect Dis. 2004;8(6):390-8.
5. Srichaikul T, Nimmannita S. Haematology in dengue and dengue haemorrhagic. Baillieres Best Pract Res Clin Haematol. 2000;13 (2):261-76.
6. Kao CL, King CC, Chao DY, Wu HL, Chang GJ. Laboratory diagnosis of dengue virus infection: current and future perspectives in clinical diagnosis and public health. J Mibrobiol Immunol Infect. 2005;38(1):5-16.
7. Ageep AK, Malik AA, Elkarsani MS. Clinical presentations and laboratory findings in suspected cases of dengue virus. Saudi Med J. 2006;27(11):1711-3.
8. Sharma SK, Seth T, Mishra P, Gupta N, Agrawal N, Broor S, et al. Clinical profile of dengue infection in patients with hematological diseases. Mediterr J Hematol Infect Dis. 2011;3:e2011039.
9. Tewari K., Tewari V.V., Mehta R. Clinical and hematological profile of patients with dengue fever at a tertiary care hospital – an observational study. Mediterr J Hematol Infect Dis 2018, 10(1): e2018021, DOI: http://dx.doi.org/10.4084/MJHID.2018.021
10. Karmakar S, Patil N. A study of hematological profile in dengue fever in a tertiary care hospital. Int J Health Sci Res. 2022; 12(3): 18-22. DOI: https://doi.org/ 10.52403/ijhsr.20220303
11. Virgin Joena, Ananda Xavier Pragasam R. Clinical profile and role of haematological parameters in the prognosis of dengue fever patients admitted in a tertiary hospital. International Journal of Contemporary Medical Research 2019;6(11):K10-K14.