ASSESSMENT OF ROLE OF BLOOD GROUP IN DENGUE PATIENTS

Dr. Indu Saxena[1], Dr. Sumeet Gupta[2*]

1. and 2. Assistant Professor, Department of Pathology, National Institute of Medical Sciences & Research, Jaipur

*Email id of the corresponding author-

ABSTRACT:

Background: All the markers used for diagnosis of dengue and predictor of its severity includes certain laboratory tests age, viral strain, nutritional status, secondary infections, HLA, and ABO blood group. Various studies reported that individuals with different ABO blood groups showed different susceptibility to dengue viral disease. However, few studies have reported the higher prevalence and severity of Dengue among certain blood groups. **Material & Methods:** The present cross-sectional study was conducted at the department of pathology of our tertiary care hospital. The study duration was of six months from January 2015 to June 2015. Patients who had dengue IgM antibody positive were enrolled for the present study by simple random sampling. Clearance from Institutional Ethics Committee was taken before the start of the study. **Results:** Based on blood grouping maximum numbers of subjects (40%) were of O blood group, 28% were of A blood group, 27% were of B blood group and 5% were of AB blood group. Among all the blood groups lymphocytosis was predominantly seen (58%) and among all the blood groups it was predominantly reported among O blood group (26%). Among all the blood groups atypical lymphocyte (10-20 %) <20% was predominantly seen (70%) and among all the blood groups it was predominantly reported among O blood group (28%). Among all the blood groups platelet count ≤0.5 lakhs / cu mm was predominantly seen (59%) and among all the blood groups it was predominantly reported among O blood group (23%). These differences were statistically significant (p-value < 0.05). **Conclusion:** present study concludes that blood groups O and B can be considered as a prognostic marker in dengue case severity.

Keywords: Dengue fever, ABO blood groups, lymphocytosis.

INTRODUCTION:

The prevalence of dengue viral infection has tended to rise globally in recent decades (1). According to the World Health Organization, about forty percent of the world's population reported that in the current scenario are at risk for encountering dengue viral infection (2). Dengue is an emerging epidemic disease and several outbreaks among every state of India are being reported from time to time (3). In India, the burden and prevalence of dengue viral infection are increasing as trends are reported globally. Hence, along with global pandemic concerns, dengue has become a major public health concern in India. The etiology behind

dengue is reported as a vector-borne viral disease that is transferred to humans by the bite of the infected Aedes mosquito. It was also reported that the number of dengue vectors (Aedes mosquito) also increased which is also contributing to the high prevalence of dengue viral infections (4).

Due to its high incidence and prevalence rates of dengue viral infections in India, a national vector-borne diseases control program is initiated for integrated management of vectors, surveillance and monitoring, and diseases prevention along with treatment (5). World health organization also reported that as the high prevalence of dengue infection is seen worldwide it requires immediate action and planning to combat the situation. It is reported that globally more than 2.5 billion of the population live in areas that are endemic for dengue viral infection. Approximately about 50 million new dengue infections are reported each year with an estimated mortality of more than 25000 globally (6). There were also reports of metastasizing of dengue viral infection exponentially breaching the geographical borders (7). The estimated incidence rate of dengue infections is 1% of the global population while estimated mortality among them is approximately 20% (1).

All the markers used for diagnosis of dengue and predictor of its severity include certain laboratory tests age, genetics, viral strain, nutritional status, and secondary infections. In the genetic factors category, we have HLA and ABO blood groups. Various studies reported that individuals with different ABO blood groups showed different susceptibility to dengue viral disease. However, few studies have reported the association of Dengue infection and blood groups, while some

have shown the higher prevalence and severity of Dengue among certain blood groups (8). Hence, the present study was conducted to assess the impact of Dengue among different ABO blood groups and their association with ABO blood groups.

MATERIALS & METHODS

The present cross-sectional study was conducted at the department of pathology of our tertiary care hospital. The study duration was of six months from July 2015 to December 2015. A sample size of 100 was calculated at a 95% confidence interval at a 10 % acceptable margin of error by epi info software version 7.2. Patients who had dengue IgM antibody positive were enrolled for the present study by simple random sampling. Clearance from Institutional Ethics Committee was taken before the start of the study.

Blood grouping was done by forwarding the Blood grouping -Slide method with Anti-A, Anti-B sera, and results were recorded. The results of hematocrit and blood counts were also recorded. The peripheral smears (for a visual check of platelet counts) were examined and the differential count pattern was established along with analysis of atypical lymphocyte count. Patients with other infections like Malaria and Typhoid were excluded from the present study. All the data was recorded on a Microsoft excel spreadsheet and data analysis was done at 5% alpha and 95% confidence interval using SPSS v22 software. Test of significance was applied on collected and organized data and a p-value less than 0.05 was considered as a statistically significant association between study variables.

RESULTS

In the present study, we enrolled 100 patients who were serologically confirmed with dengue IgM antibodies. No patient in the present study aged less than 15 years of age. The mean age of the enrolled patient was 34.36 ± 5.19 years. Out of the total patients diagnosed dengue IgM antibody positive 56% were male and 44% were females. All of these patients with dengue viral fever were subjected to routine blood investigation for complete blood count and peripheral smear examination and blood grouping. Based on blood grouping the maximum number of subjects (40%) were of O blood group, 28% were of A blood group, 27% were of B blood group and 5% were of AB blood group. (Table 1)

Table 1: Distribution of study subjects according to study parameters.

Parameters	No. of patients
Mean age	34.36 ± 5.19 years
Gender	
Male	56%
Female	44%
Blood groups	
A	28%
B	27%
AB	5%
O	40%

In the present study, out of a total of 100 study participants, on the assessment of blood group with differential count pattern, it was found that among all the blood groups lymphocytosis was predominantly seen (58%) and among all the blood groups it was predominantly reported among O blood group (26%). Neutrophilia was reported among 10% of subjects however its incidence was nearly similar among A, B, and O blood groups (4%, 3%, and 3% respectively). This difference was statistically significant (p-value < 0.05). (Table 2)

Table 2: Association of blood group with differential count pattern.

Blood groups	Normal pattern	Lymphocytosis	Neutrophilia	P value
A	11%	13%	4%	**<0.05**
B	8%	16%	3%	
AB	2%	3%	0	
O	11%	26%	3%	

In the present study, out of a total of 100 study participants, on the assessment of blood group with atypical lymphocytosis, it was found that among all the blood groups atypical lymphocyte (10-20 %) <20% was predominantly seen (70%) and among all the blood groups it was predominantly reported among O blood group (28%). Atypical Lymphocyte count ≥20 % was reported among 30% of subjects and among all the blood groups it was predominantly reported among O blood group (13%). This difference was statistically significant (p-value < 0.05). (Table 3)

Table 3: Association of blood group with atypical lymphocytosis.

Blood groups	Atypical lymphocyte (10-20 %) <20%	Atypical Lymphocyte count ≥20 %	P value
A	23%	5%	<0.05
B	16%	11%	
AB	3%	1%	
O	28%	13%	

Table 4: Association of blood group with Platelet count.

Blood groups	Platelet count ≤0.5 lakhs / cu mm	Platelet count >0.5 lakhs / cu mm	P value
A	17%	11%	<0.05
B	18%	9%	
AB	1%	3%	
O	23%	18%	

In the present study, out of a total of 100 study participants, on the assessment of blood group with platelet count, it was found that among all the blood groups platelet count ≤0.5 lakhs / cu mm was predominantly seen (59%) and among all the blood groups it was predominantly reported among O blood group (23%). Platelet count >0.5 lakhs / cu mm was reported among 41% of subjects and among all the blood groups it was predominantly reported among the O blood group (18%). This difference was statistically significant (p-value < 0.05). (Table 4)

DISCUSSION

Dengue is an emerging epidemic disease and several outbreaks among every state of India are being reported from time to time (3). In India, the burden and prevalence of dengue viral infection are increasing as trends are reported globally. Hence, along with global pandemic concerns, dengue has become a major public health concern in India. It was also reported that the number of dengue vectors (Aedes mosquito) also increased which is also contributing to the high prevalence of dengue viral infections (9). In the present study, we enrolled 100 patients who were serologically confirmed with dengue IgM antibodies. No patient in the present study aged less than 15 years of age. The mean age of the enrolled patient was 34.36 ± 5.19 years. Out of the total patients diagnosed dengue IgM antibody positive 56% were male and 44% were females. All of these patients with dengue viral fever were subjected to routine blood investigation for complete blood count and peripheral smear examination and blood grouping. Based on blood grouping the maximum number of subjects (40%) were of O blood group, 28% were of A blood group, 27% were of B blood group and 5% were of AB blood group. Similar results were obtained in a study conducted by Vitthal K et al among patients with dengue viral fever. They reported similar findings with the present study (10).

In the present study, out of a total of 100 study participants, on the assessment of blood group with differential count pattern, it was found that among all the blood groups lymphocytosis was predominantly seen (58%) and among all the blood groups it was predominantly reported among O blood group (26%). Neutrophilia was reported among 10% of subjects however its incidence was nearly similar among A, B, and O blood groups (4%, 3%, and 3% respectively). This difference was statistically significant (p-value < 0.05). Similar results were obtained in a study conducted by Mehta R et al among patients with dengue viral fever. They reported similar findings with the present study (11). In the present study, out of a total of 100 study participants, on the assessment of blood group with atypical lymphocytosis, it was found that among all the blood groups atypical lymphocyte (10-20 %) <20% was predominantly seen (70%) and among all the blood groups it was predominantly reported among O blood group (28%). Atypical Lymphocyte count ≥20 % was reported among 30% of subjects and among all the blood groups it was predominantly reported among the O blood group (13%). This difference was statistically significant (p-value < 0.05). Similar results were obtained in a study conducted by Vaibhav M et al among patients with dengue viral fever. They reported similar findings with the present study (12).

In the present study, out of a total of 100 study participants, on the assessment of blood group with platelet count, it was found that among all the blood groups platelet count ≤0.5 lakhs / cu mm was predominantly seen (59%) and among all the blood groups it was predominantly reported among O blood group (23%). Platelet count >0.5 lakhs / cu mm was reported among 41% of subjects and among all the blood groups it was predominantly reported among the O blood group (18%). This difference was statistically significant (p-value < 0.05). Similar results were obtained in a study conducted by Siripen K et al among patients with dengue viral fever. They reported similar findings with the present study (13).

CONCLUSION

We concluded from the present study that the clinical and laboratory findings help in predicting the severity of dengue cases if laboratory investigations were carried out timely. various associated factors like age, sex, race, and blood groups were also prognostic markers in dengue. Our study concludes that blood groups O and B can be considered as a prognostic marker in dengue case severity.

REFERENCES

1.   Murray NEA, Quam MB, Wilder-Smith A. Epidemiology of dengue: past, present, and future prospects. Clin Epidemiol [Internet]. 2013;5:299–309.   Available   from: http://www.ncbi.nlm.nih.gov/pubmed/23990732

2.   World Health Organization,   Dengue. SEARO [Internet]. 2015; Available from: http://www.searo.who.int/entity/vector_borne_tr opical_diseases/data/data_factsheet/en/

3.   Dikid T, Jain SK, Sharma A, Kumar A, Narain JP. Emerging & re-emerging infections in India: an overview. Indian J Med Res [Internet]. 2013;138(1):19–31. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24056553

4. Malavige GN, Fernando S, Fernando DJ, Seneviratne SL. Dengue viral infections. Postgrad Med J [Internet]. 2004 Oct 1;80(948):588–601. Available from: https://pmj.bmj.com/content/80/948/588

5. Tatem AJ, Rogers DJ, Hay SI. Global transport networks and infectious disease spread. Adv Parasitol [Internet]. 2006;62:293–343. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16647974

6. Fredericks AC, Fernandez-Sesma A. The Burden of Dengue and Chikungunya Worldwide: Implications for the Southern United States and California. Ann Glob Heal [Internet]. 2014 Nov 1;80(6):466–75. Available from: https://www.sciencedirect.com/science/article/pii/S2214999615000119

7. Kalayanarooj S. Clinical Manifestations and Management of Dengue/DHF/DSS. Trop Med Health [Internet]. 2011 Dec;39(4 Suppl):83–7. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22500140

8. Dantés HG, Farfán-Ale JA, Sarti E. Epidemiological trends of dengue disease in Mexico (2000-2011): a systematic literature search and analysis. PLoS Negl Trop Dis [Internet]. 2014;8(11):e3158. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25375162

9. Gurugama P, Garg P, Perera J, Wijewickrama A, Seneviratne S. DENGUE VIRAL INFECTIONS. Indian J Dermatol [Internet]. 2010 Jan 1;55(1):68. Available from: /pmc/articles/PMC2856379/

10. Khode V, Ruikar K, Kabbin G. Association of ABO Rh blood group with dengue fever and dengue hemorrhagic fever: A case-control study. J Appl Hematol [Internet]. 2013;4(4):145. Available from: https://www.jahjournal.org/article.a

11. R.C. M, H.M. G, R.K. K, P.S. P, U.V. P, M.M. V, et al. importance of complete blood count and peripheral smear examination in early diagnosis of dengue patients. J Infect Dis Lett [Internet]. 2013 Nov 23;2(1):22–4. Available from: https://bioinfopublication.org/pages/article.php?id=BIA0001969

12. Mane V, Professor of Pathology A, Mohite MBBS S. Clinicopathological study of 50 cases of Dengue. Int J Med Res Rev [Internet]. 2015 Sep 30;3(8):794–9. Available from: https://ijmrr.medresearch.in/index.php/ijmrr/article/view/324/633

13. Kalayanarooj S, Gibbons R V., Vaughn D, Green S, Nisalak A, Jarman RG, et al. Blood group AB is associated with increased risk for severe dengue disease in secondary infections. J Infect Dis [Internet]. 2007 Apr 1;195(7):1014–7. Available from: https://pubmed.ncbi.nlm.nih.gov/17330792/