Original Research Article

Distribution of blood group types among dengue patients

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Abstract

Background: Infection with dengue virus is a serious health problem worldwide. Previous studies on ABO blood group and dengue fever are limited. Blood groups act as antigen and are the receptors for various etiological agents. Retrospective study was conducted to know the association between various blood groups to dengue fever. **Objectives:** To investigate the ABO blood group distribution with prevalence of dengue fever in and around Kolhapur city. **Material and method:** Data collected from various laboratories and blood banks across the city From March 2018 to August 2018 for the patients suffering from Dengue fever. A total number of 280 Dengue NS1, IgM, IgG positive. Patients with low platelet counts were studied. Collected data assessed and analysed by using Pie chart and bar diagram for distribution among various ABO blood groups. **Result:** Number of males affected with moderate dengue fever is 64% as compared to 36 % of female. [2]48.93% of patients suffering from dengue fever are in the age group of 20-40 years. [3]In this study we found incidence of A+ve patients having moderate dengue fever requiring platelet transfusions is 32.14% whereas the distribution of A+ve blood group in population is 21.7% O+ve patient getting moderate dengue fever is 31.43% which is as per the distribution of O+ve blood group that is 35.1% in population. **Conclusion:** The Dengue virus fever is more common in males of active age group. The present viral antigen has probably more affinity to Antigen of A and Anti B Antibodies resulting into more incidences in patients having Blood group A followed by blood group O.

Key Word: Dengue Fever, Blood Groups, Blood antigens

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INTRODUCTION

Dengue is one of the most common febrile illness in coastal part and western Maharashtra of India. Complication of dengue fever is serious emerging health threat worldwide. This rapidly spread febrile illness caused by Flavivirus. Transmitted by AedesMosquito[1,2]. Dengue is commonest arthropod born viral infection in human being. Dengue is an endemic disease of India and also including, Indonesia, Maldives, Srilanka, Thailand and Timor Leste are the other countries where the dengue is potential threat to the health personals. Globally every year 50-100 million people get infected from the dengue WHO classifies dengue into non-severe dengue and severe dengue based on warning signs. Warning signs are Persistent vomiting, Abdominal pain, Mucosal bleed organomegaly. severe plasma leakgeleds to shock which is known as dengue shock syndrome[3,4] later severe organ involvement and severe bleeding leads to serious threat for life. In 2016 WHO has revised the classification based on signs and Symptoms with Laboratory values which includes decrease in WBC count, platelet count and rise in haematocrit. There are basically four types of dengue serotypes DENV-[1,2,3,4] worldwide. Infection with any serotype may be asymptomatic or may have severe problem that leads to complication The risk factor for dengue fever are very complicated and difficult to understand .There are lots of risk factors which are involved in dengue infection eg- age, superadded infection and virus strain pattern but the genetic factor of host is the key determining factor for infection of

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degue[5,6]. First study on the blood groups and various diseases are done and hypothesised in 1960. The genes for ABO blood groups system were discovered in 1990. There are different classification of human blood group out of which ABO system is worldwide easy and accepted[6-9]. ABO system of classification based on the different antigen present on the RBC surface. In a ABO system there are 4 types of blood groups these are A, AB, B and O.[10] Human ABO blood group system shows that there is difference in susceptibility or resistance to various bacterial and viral infections[9,11]. The severity of different infections is also differing in different blood groups. Previous studies on dengue shows the blood group commonest for the dengue infection or most susceptible for infection and severity of the dengue I various blood groups .Hence based on that we hypothesized that there could be association between RBC antigen and dengue fever[6,7,8]. The severity of the dengue strain based on RDP required for transfusion.

MATERIAL AND METHODS

The study is carried out in Kolhapur district part of Western Maharashtra on 282 subjects. This study Includes both gender and all age group patients registered for this study. This study is based on the diagnosed case of dengue patients with Blood groups and number of RDPs required for the transfusion in low platelet count state or complicated case of dengue. Diagnosis is done by clinically and laboratory method. Clinical diagnosis is based on WHO classification of dengue infections and grading of severity of DHF (Revised criteria, 2016).The diagnosis is confirmed in Lab serologically by ELISA for IgM, IgG and NS[2,3]. Simultaneously the patient's blood group is done in lab .The data were collected from the Hospital lab for Blood groups and various blood banks for the number of RDPs required for the same patient during period of treatment. Collected data is studied and analysis done with the help of Excel sheet, Bar diagrams and Pie charts.

Inclusion Criteria

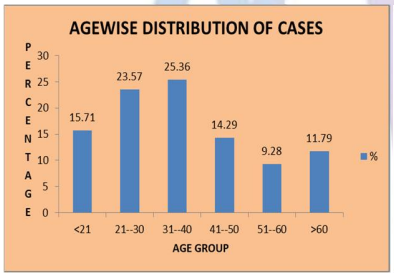
1. All NS1, IgM and IgG positive patients
2. All age groups

Exclusion Criteria

1. Pregnant Females

RESULTS

The bar diagram below (Diagram 1) shows that age group 21 to 40 are the main age group which shows the maximum frequency .and males have more preponderance of infection.



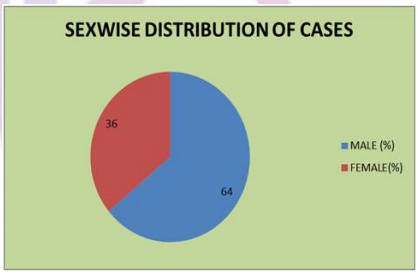


Diagram 1: Age Wise distribution of Dengue Fever; **Diagram 2:** Gender wise distributions of Dengue patients

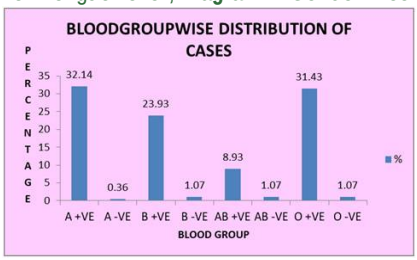


Diagram 3: Distribution of Blood group among Dengue patients

The frequencies of each blood group in the dengue disease in population are presented in Diagram 3. Of the 282 patients of the dengue patient 32.14%, 31.43 % 23.43% 8.93%, 1.07,1.07, 0.36 had blood group A^+, O^+, B^+, AB^+, O^-, B^-, A^-. On the basis of severity, the O+ blood group shows the maximum severity and requires a greater number of RDPs. show in bar diagram-4 below.

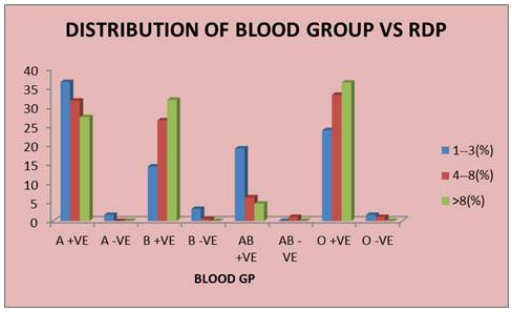


Diagram 4: Distribution of RDP required for various blood groups

DISCUSSION

ABO and Rhesus blood groups are system of blood grouping in Human population. Data based on the frequency of antigen types present in various blood groups. Blood Group O contains alleles for both the antigen I^A ,^{IB}. Blood group A contains I^A ,Blood Group B contain I^B. AB Blood group contain no antigen .This Blood grouping system is useful in population genetic studies, researching population migration patterns as well as resolving certain medico-legal issues, particularly disputed parentage , organ transplantation and blood transfusions. Anti A and Anti B present in people of non antigen blood groups. However, ABO, Rh- system is used as study purpose in association of various infections based on susceptibility for that infection. Frequency of various blood Groups in Indian population are O> B> A. The ABO system derives its importance from the fact that A and B are strongly antigenic and anti A and anti B occur naturally in the plasma of persons lacking the corresponding antigen. These antibodies are capable of producing hemolysis in vivo. The Blood group O is the Most common in population infection of various diseases are mostly seen in Patient having blood group O. This study is done in western Maharashtra shows the More susceptibility for Blood group A (32.50%) and O(32.50%). blood group A has Antigen A and blood group O has Antigen A and Antigen B. If we include blood group A and O both which is the Percentage of 72.22%. For Blood Group B the Antigen Is B and allele is I^B. and the frequency is 23.93 and the blood groups containing antigen B are Blood group 'B' and 'O'. The total percentage of both is 63.88%. The P-value of study is 0.04 which is less than 0.05which is statically significant. So this signifies that Dengue fever is more susceptible for Antigen A (Allele A) than Antigen B(Allele B). Out of all Blood groups O is most common and population having more cases of Dengue fever in community. Frequency of Blood group A is less common in compare to O and B but having the higher chances of infection for dengue fever. So from this we can conclude that blood group 'O' has maximum cases of Dengue fever in community but the incidence of dengue fever is Highest in blood group 'A' and dengue virus is having more susceptibility for the antigen A (Allele I^A)

CONCLUSION

Incidence of Dengue fever is more common in male as compare to female of 3rd and 4th decade according to this study. Out of all the patients included in the study, a total of 74% had either blood group O or A. so it can be extrapolated that 74% had antigen A. Thus, from our study we can conclude that Dengue virus seems more likely to interact with Antigen A which is present in patients of blood group A and O as compare to Antigen B which is present in those with B and O. Previous study on ABO and blood group done in North East and Karnataka show higher incidence of Dengue in patients of Blood Group O. The Indian population have higher percentage of blood group O (37.12%) This study shows that number of cases of Dengue are more in Patients of blood O but incidence is less for the same blood group in community as the O is more common. Incidence of dengue fever is more in Blood group A but the number of cases are less in comparison to Blood Group O with same reason Percentage of Blood group A is less than Blood group O and B. Our study was conducted in Western Maharashtra and shows that there is equal incidence of Dengue for Blood Group A and Blood Group O. This Study also shows that the Dengue virus is more susceptible for Antigen A (present in Blood group A and O) in comparison to Antigen B (Present in Blood group B as well as Blood group O).

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