

RESEARCH ARTICLE

A study to find out association between blood group and platelet count

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ABSTRACT


Background: Blood group antigens are protein structure on red blood cell membrane, and platelet has receptors on its surface for binding which are also protein in nature. **Aims and Objectives:** Thus, some genetic association for certain blood group types with platelet function and count can shade some light in this area of research. **Materials and Methods:** A total of 51 cases were included in the present study. All healthy male and female subjects above 18 years were included in our study. Prior Indian Ethics Committee approval was taken, and information sheet was provided about the present study and only when voluntary consent subjects' 0.5 ml venous blood was collected aseptically. Basic information about name, age, and gender was collected. Platelet count was calculated using an autoanalyzer instrument. Data analysis was done using MedCalc v18.6 software. $P < 0.05$ was considered significant. **Results:** Out of 51 cases the majority of subjects were A positive and B positive with 16 in each case. Highest platelet count was found in B positive blood group at 241562 ± 69970 . Lowest platelet count was found in AB positive blood group at 216142 ± 51689 . **Conclusion:** On applying single factor ANOVA for finding out the association between platelet count and blood group, P value was present at 0.934. As P value is >0.05 , the present study concludes that there is no association between ABO type and platelet count. Other studies like Sweeney *et al.*,^[1] show that platelet count of A blood group was similar to present study while for O blood group platelet count was higher than the present study. However, a further rigorous study involving von Willebrand factor and blood serotonin level can shade more light in this research area.

KEY WORDS: Blood Groups; ABO Type; Platelet Count

INTRODUCTION

Blood group antigens and platelet surface receptor for binding have long been thought to have some similarity in the genetic arrangement. Karl Landsteiner is well known for the discovery of ABO blood group in 1901 AD.^[2] There are numerous studies which show that certain types of diseases are more common in certain blood group types such as

Type O have higher chances of tuberculosis, Type A and O have higher chances of Plasmodium vivax (Malaria parasite) infections, and Type B have higher chances of Plasmodium falciparum (another malaria parasite) infections.^[3] Thus, it's quite evident that certain blood groups have certain diseases more commonly than others. It may be associated with a genetic predisposition, or it may be even immunological reactions which different individual with different blood groups has against certain diseases. Now blood group type may have a genetic predisposition or immunological influence on number of red blood cell, white blood cell, and platelets.^[4] To find any association of blood group and various hemogram values, this study is conducted. It may indicate the possibility of anemia, infections or thrombocytopenia in certain blood group individuals.

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MATERIALS AND METHODS

In total 51 cases are included in the span of 15 days from start of the study. Prior Institutional Ethics Committee approval was taken for this study. Healthy individuals will be given information sheet about the present study detailing all procedures and aims and objectives of the present study. Basic questions about any known thrombocytopenic diseases will be asked and noted down. The subject will be informed about procedure and risk and benefit of study and will be included in the study only if given voluntary consent. Blood sample of 0.5 ml will be collected incompletely sterilized and standard universal protocol. This blood sample will be passed through autoanalyzer in which tests like platelet count will be done. Furthermore, blood group type, that is, ABO and Rh will be analyzed to know the blood group of the individual.

All healthy male and female subjects and all age (above 18) group individuals are included. Persons not willing to give consent were excluded. All teaching staff, postgraduates and undergraduates of Shri M. P. Shah medical college, Jamnagar, have been excluded.

Quantitative data were analyzed by single-factor ANOVA using MedCalc software v18.6. $P > 0.05$ is considered as not significant. $P < 0.05$ is considered as significant. $P < 0.01$ is considered as highly significant.

RESULTS

In the present study, Table 1 shows a number of cases distributed in ABO and Rh blood group system. Table 1 shows that majority of cases are of A positive and B positive blood group types with each having 16 subjects, while least number of subjects were in B negative and O negative group each having 2 individuals.

In the present study, mean and standard deviation of platelet count (per cumm) in A positive blood group is 238187 ± 48349 . Same way mean and standard deviation of platelet count of B positive blood group is 241562 ± 69970 and for B negative blood group 240500 ± 28991 , and AB positive blood group 216142 ± 51689 , and O positive blood group 238750 ± 38839 , and O negative blood group is 221000 ± 16970 (Table 2).

DISCUSSION

In the present study, A blood group is having platelet count with mean and standard deviation at 238187 ± 48349 /cumm. In the present study, O blood group is having platelet count with mean and standard deviation at 229875 ± 27905 /cumm. In our study, AB positive blood group has the lowest platelet count. In the present study, P value of single factor

Table 1: Distribution of ABO and Rh blood group types

Blood groups	Number of cases
A positive	16
B positive	16
B negative	2
AB positive	7
O positive	8
O negative	2
Total	51

Table 2: Distribution of mean and standard deviation of platelet count among various blood groups

Blood group	Mean platelet count	Standard deviation
A positive	238,187	48,349
B positive	241,562	69,970
B negative	240,500	28,991
AB positive	216,142	51,689
O positive	238,750	38839
O negative	221,000	16,970

ANOVA applied using MedCalc v18.6 software for finding an association between platelet count and blood group types, was found to be at 0.934. Thus, indicating no association between platelet count and blood group type.

Compare to the present study, in Sweeney *et al.* study,^[1] A blood group individuals had platelet count with mean and standard deviation at 239000 ± 47000 /cumm. Thus, the present study and Sweeney *et al.* study^[1] have very similar findings. Similarly compare to present study, in Sweeney *et al.* study, O blood group individuals had platelet count with mean and standard deviation at 286000 ± 68000 /cumm. Thus, our study has low platelet count compared to Sweeney *et al.* study.^[1] In other studies, like Mozaheb,^[5] it was found that B blood group had the lowest platelet count and higher chances of developing HELP syndrome. Furthermore, in Akdemir *et al.* study,^[6] A blood group has the lowest platelet count as the majority of patients with A blood group had an emergency recurrent miscarriage. Thus, different studies show different blood group association with platelet count and do not correlate with a present study which has the lowest platelet count for AB positive blood group.

The present study included all age and gender individuals from all socioeconomic backgrounds thus ruling out confounding factors associated with it. However, sample size was limited, and thus results should be corroborated in similar fashion.

To conclude, mean platelet count of the present study and Sweeney *et al.* study^[1] was similar but had in our study O blood group type had lower platelet count in comparison to Sweeney *et al.* study.^[1] In Mozaheb,^[5] B blood group had lowest platelet count and in Akdemir *et al.* study,^[6] A blood

group had lowest platelet count, but in the present study it was AB positive blood group which had lowest platelet count.

CONCLUSION

A total of 51 cases within study period of 6 months showed that highest amount of platelet count was found in B positive blood group (241562 ± 69970) and lowest amount was found in AB positive blood group (216142 ± 51689). However, $P > 0.05$ (0.934) indicates that there is no association between platelet count and blood group type. Thus, thrombocytopenia or hypercoagulable state is not associated with any blood group antigen. However larger sample size and more rigorous analysis such as von Willebrand factor or blood serotonin level can shade more light in this area of research.

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