(15) ASSOCIATION BETWEEN ABO BLOOD GROUP AND RHEUMATIC HEART DISEASE

*Dr. Omnath Prasad Yadav, **Dr. Hiteshkumar K. Solanki, ***Dr. Krishna Singh, ****Dr. N. P. Gopinath, *****Dr. Sushil Kumar

C. U. S. M. C., Surendranagar
*Assistant Professor of Physiology (Author)
**Assistant Professor of Physiology
***Professor of Physiology (Darbhanga Medical College. Bihar)
****Professor of Physiology
*****Professor of Physiology

ABSTRACT:

INTRODUCTION: Now a day, heart disease is the leading cause of morbidity and mortality in the industrialized nations. From an epidemiological point of view Rheumatic fever and Rheumatic heart disease cannot be separated. Both of them are a major cardiac cause of disability and death. The onset of Rheumatic fever is usually preceded by a Streptococcal sore throat caused by Group-A Streptococcus one to four weeks earlier. Attempts have been made to correlate the occurrence of rheumatic fever and Rheumatic heart disease with genetically determined red blood cell groups, particularly ABO system. Clarke had shown statistically significant association between Rheumatic disease and blood groups.

OBJECTIVE: Goal of our study to observe the association between ABO blood group and rheumatic heart disease.

METHOD: 120 cases of Rheumatic heart disease patients taken. 2500 controls of ABO blood groups taken. The entire subject were instructed about study and written consent taken. History and clinical examination was done.

The selection of cases of Rheumatic fever was made by Jones's Criteria. Blood from vein is drawn for estimation of ABO blood group and for diagnosis of rheumatic heart disease. Statistical analysis was done by chi-square test. P value less than 0.05 considered as a significant.

RESULT: Out of 120 cases, 36 patients were of group 'A' (30.00%), 46 patients were of group 'B' (38.33%), 27 were of group 'O' (22.50%) and 11 cases were of group 'AB' (9.17%). In control cases, 37.08% belongs to group 'B', 33.08% to blood group 'O'. 21.48% to blood group 'A' and only 8.36% to AB. Its comparison with control series revealed that there was an apparently increased frequency of disease in the 'A', 'B' and 'AB' blood group and a decrease in blood group 'O'. There is increased incidence in blood group 'A' and low incidence in Blood group 'O'.

This chi-square value revealed and it is significant [P value between 0.05 and 0.02 i.e. < 0.05 and Degree of freedom (D.F.) = 3].

CONCLUSION: It is concluded therefore that, group 'A' individuals are more susceptible to rheumatic heart disease while group 'O' individuals are relatively resistant to the disease.

KEY WORDS: Rheumatic fever, Streptococcus, ABO system, Sore throat, Rheumatic heart disease

MAIN ARTICLE

INTRODUCTION:
Several studies show that the environmental, bacterial and host factors apparently play its role in the development of Rheumatic fever. There is growing body of evidence to suggest that there is genetic constitution or rheumatic constitution, which expresses itself in the form of hypersensitivity or auto-immune response to invasion of Streptococcus (3.7). Khattab and Ismail (1960) and Buckwalter (1962) who have found an increased incidence of rheumatic fever in persons of blood group 'A' and a significant decrease of the disease in persons of group 'O'(2,10).

The existence of serological differences between individuals was first described by Landsteiner (1901) at the turn of century. He classified people into one of the four groups, depending on whether their red cells contained 'agglutinogen A', 'agglutinogen B' neither A or nor B (O) or both A and B (AB). In India, Rheumatic heart disease account for 33-50% of all cardiac death and over six million children are affected by the disease (4,9).

Rheumatic fever occurs at all ages, except infancy, but incidence peaks between 5-15 years, a period when Streptococcal infections are most frequent (1,5). The disease occurs with about equal frequency in both sexes with no significant racial productivity. Glynn and Halborow (1952, 1961) postulated that Streptococci possibly convert the blood group substances secreted in saliva to antigens, which led to the causation of Rheumatic fever (6).

MATERIALS AND METHODS:
120 cases of Rheumatic heart disease patients taken. 2500 controls of ABO blood groups taken.

Experimental protocol was explained and consent was taken.
History was taken and clinical examination (general and systemic) done for inclusion and exclusion criteria.

 ➢ **Inclusion Criteria:**

 1) Male and Female both are included.
 2) No history of drug, blood transfusion or any condition that affect blood cell count.

 ➢ **Exclusion Criteria :**

 1) Controls with any known general or systemic disease.
 2) Any history of drug or medication that affect blood cell count.

3) Female with pregnancy and menstrual period.

4) Any un co-operative individual.

> ➤ **Experimental Protocol :**

1) All the subjects filled the consent form that they are willing to participate in the study.

2) History and clinical examination was done for inclusion and exclusion criteria.

3) Blood from vein is drawn for estimation of ABO blood group and for diagnosis of rheumatic heart disease.

4) The selection of cases of Rheumatic fever was made by Jones's Criteria:

(A) MAJOR CRITERIA:
Carditis
Polyarthritis
Chorea
Erythema marginatum
Subcutaneous nodules

(B) MINOR CRITERIA:
(a) Clinical findings:
Fever
Arthralgia
(b) Laboratory findings:
Increased ESR
Increased acute phase reactant
Increased C reactive protein
Prolonged PR interval on ECG.

Supporting Evidence of Antecedent Group A Streptococcus Infection :
- Positive throat culture
- Rapid Streptococcus antigen test.
- Elevated or Rising Streptococcus Antibody titre.

If supported by evidence of preceding Group A Streptococcal infection, the presence of two minor manifestations or of one major and two minor manifestations indicate a high probability of acute Rheumatic fever.

5) Statistical analysis was done by chi-square test.

STATISTICAL ANALYSIS:
Statistical analysis was done by chi-square test. P value less than 0.05 considered as a significant.

RESULT:

Out of 120 cases, 36 patients were of group 'A' (30.00%), 46 patients were of group 'B' (38.33%), 27 were of group 'O' (22.50%) and 11 cases were of group 'AB' (9.17%). In control cases, 37.08% belongs to group 'B', 33.08% to blood group 'O'. 21.48% to blood group 'A' and only 8.36% to AB. Its comparison with control series revealed that there was an apparently increased frequency of disease in the 'A', 'B' and 'AB' blood group and a decrease in blood group 'O'. There is increased incidence in blood group 'A' and low incidence in Blood group 'O'. This chi-square value revealed and it is significant [P value between 0.05 and 0.02 i.e. < 0.05 and Degree of freedom (D.F.) = 3].

TABLE 1: Percentage distribution of ABO blood groups in controls and patients of rheumatic heart disease.

	A	B	0	AB
Control	21.48	37.08	33.08	8.36
Rheumatic heart disease	30.00	38.00	22.50	9.17
Difference	+8.52	+1.25	-10.58	+0.81

TABLE 2: The computed distribution of two groups on the hypothesis of no significance (Expected values).

	A	B	0	AB
Control (2500)	547	928	815	210
Rheumatic heart disease (120)	26	45	39	10

TABLE 3: Showing the relative incidence based upon blood group frequencies in rheumatic heart patients and control.

Compared Blood Groups	Relative Incidence	Chi-Square	Degree of Freedom	Probability	% of probability being significant
Group A to O	1.99	8.39	1	0.005	Highly significant
Group B to O	1.49	2.81	1	0.1	90%
Group AB to O	1.58	1.48	1	0.34	66%
Group Non-O to O	1.66	5.73	1	0.02	Highly significant

DISCUSSION:

In the present work the study was made on 120 cases of rheumatic heart disease and their blood group was analysed. Out of 120 cases, 36 patients were of group 'A' (30.00%), 46 patients were of group 'B' (38.33%), 27 were of group 'O' (22.50%) and 11 cases were of group 'AB' (9.17%). Its comparison with control series revealed that there was an apparently increased frequency of disease in the 'A', 'B' and 'AB' blood group and a decrease in blood group 'O'. Chi-square x^2 method for such analysis and it was found that there is increased incidence in blood group 'A' and low incidence in Blood group 'O'.

Rheumatic fever follows infection of upper respiratory tract with group 'A' Streptococcus which was found as early as 1900 by Poyton and Payne, Collis (1931) also found the Streptococcus haemolytics Group 'A is containing related to the etiopathogenesis of rheumatic fever (2,8). For group 'a' to O the X^2 value 8.39 was found to give a probability (P) – 0.005 which is highly significant. The relatively low incidence of Rheumatic heart disease in group 'O' persons was again tested for significance by comparing collectively non 'O' to group 'O'. The relative incidence of group non 'O' to 'O' was found to 1.66 that means that group non 'O' persons are 1.66 times more prone to develop Rheumatic heart disease and the X^2 value 5.73 with D.F. = 1 gives a probability to 0.02 which is again highly significant.

In control cases, 37.08% belongs to group 'B', 33.08% to blood group 'O'. 21.48% to blood group 'A' and only 8.36% to AB. The distribution of Blood group in 120 test cases were observed as 38.33% belongs to blood group 'B', 30.00% to group 'A', 22.50% to group 'O' and only 9.17% to blood group 'AB'. The outstanding differences in the incidence of Rheumatic heart disease in blood group 'B' and 'A' was found to be statistically significant. It was more significant when incidence in blood group 'O' was compared with that of non 'O' blood group (p value = 0.02).

CONCLUSION :
It is concluded therefore that, group 'A' individuals are more susceptible to rheumatic heart disease while group 'O' individuals are relatively resistant to the disease.

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