

Distribution of ABO blood group among fertile and infertile males in central India: a pilot study

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Abstract

Background: Blood is an important component of the human body that is responsible for complete human identity. The ABO and Rh groups are very useful for blood transfusion, organ transplantation, biomedical research, and anthropological study. The blood group incompatibility has been associated with some diseases.

Objective: To examine the relationship between blood group and infertility in men and to know the frequency of different blood groups among infertile men who were referred from different infertility clinics and centers.

Materials and Methods: A total number of 88 infertile men along with 88 fertile men as controls were evaluated using the antigen–antibody agglutination test.

Result: The ABO blood group distribution among the infertile men was 40.90%, 29.54%, 19.31%, and 10.22% for blood groups O, A, B, and AB, respectively, and the prevalence of ABO blood group in fertile were 44.31%, 27.27%, 22.72%, and 05.68% for groups O, A, B, and AB, respectively.

Conclusion: This preliminary study showed that the ABO blood group has no statistically significant association with male infertility.

KEY WORDS: ABO blood group, antigen–antibody, male infertility, reproduction, Rhesus factors

Introduction

Karl Landsteiner determined the ABO blood group system first time in 1901. There are about 400 blood grouping antigens have been reported.^[1] The ABO blood group and Rhesus factors (Rh) are very useful in blood transfusion, organ transplantation, genetic research, and anthropological study in men.^[2] Several studies demonstrated that the ABO blood group is associated with some diseases. The ABO blood group also more frequent in spontaneous miscarriage

or stillbirth.^[3] Many studies have reported that the ABO blood group is not related to infertility.^[4,5] However, Khan et al.^[6] reported that the blood group O is related to male infertility.^[6] This study was undertaken to investigate any relationship between ABO blood group and male infertility.

Materials and Methods

Study Design

A total number of 88 infertile men were enrolled during July 2009 to January 2011 from different infertility clinics and centers of Bhopal and Rewa district of Madhya Pradesh, India. This study was approved by the ethical committee of the institute, and written consent from all the subjects was obtained.

In this, the population was divided into two groups:

Group A: 88 infertile men with mean age of 38.63 (± 7.13) years were enrolled in this group, which revealed at least 2 years of infertility period. Hormone profile and semen analysis were also done.

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Group B: The control group comprised 88 fertile men with mean age 33.57 (± 5.96) years who had at least two live issues without any abnormalities.

Methodology

Slide agglutination method was used for confirming blood group of all men, after obtaining their informed consent. Two milliliters of whole blood was taken from each subject by antecubital vein puncture with aseptic conditions for antigen–antibody agglutination test. A few drops of blood were kept on clean slides. A drop of each of the antisera was added and mixed with each blood drop. ABO blood groups were confirmed by antigen–antibody agglutination test.^[7]

Results

A total of 88 infertile men were included in this study. Data were recorded for their age, height, and weight. The average ages of infertile and fertile men were 38.63 (± 7.13) and 33.57 (± 5.96) years, respectively. The maximum infertile male population was found between the age group of 30–40 years, comprising approximately 50% of the entire population.

The ratio of patients to control was 1:1. The distribution of ABO blood group in infertile men shown the maximum frequency of O blood group, followed by blood groups A and B, while the AB blood group was less common in both infertile and fertile men.

The distribution of blood groups in infertile and fertile men is shown in Table 1. The prevalence of infertile men with blood groups O, A, B, and AB was 36 (40.90%), 26 (29.54%), 17 (19.31%), and 9 (10.22%), respectively, as shown in Table 1. The distribution of ABO blood group in fertile men showed that 39 (44.31%), 24 (27.27%), 20 (22.72%), and 5 (5.68%) were for groups O, A, B, and AB, respectively. There was no statistically significant difference between the distribution of the infertile and fertile men as shown in Table 1 ($\chi^2 = 1.59$, $P = 0.66$).

Discussion

The frequency distribution of ABO blood group in the infertile group was the approximately same with fertile group. There are no any significant differences in ABO blood group

distribution among both the infertile and fertile men. Distribution of blood groups in infertile men showed the maximum frequency of O blood group, followed by blood groups A, B, and AB.

Similar studies conducted by Cantuaria,^[8] Schwimmer *et al.*,^[9] and Omu *et al.*^[10] showed no significant relation between ABO blood group antigens and infertility. Solish and Gershowitz^[4] reported that there is no any relation between blood groups in husbands and wives of infertile and fertile group.^[4] Similarly, Lurie *et al.*^[11] demonstrated that the association of the Lewis blood group with infertility in among groups was not statistically different, but Khan *et al.*^[6] found strong relation between blood group O and male infertility.^[6,11] Seminal blood group antigens were found on the surface of spermatozoa, which may affect fertility in humans.

Many studies emphasized the correlation of ABO blood group with some diseases. Aird *et al.*^[12] reported that carcinoma of the stomach is related to blood group A, whereas Shamim *et al.*^[13] reported that a blood group is directly associated with cardiovascular diseases, atherosclerotic peripheral vascular diseases, and other type of cardiovascular disease. Singh *et al.*^[14] showed that malaria infection is found more in blood groups A, B, and O when compared with blood group AB.

It is interesting to note that blood group A pose a significant higher risk for gastric cancer and smallpox, and blood group B is associated with ovarian, cervix, lung, and buccal cancers. Moreover, blood group AB is associated with ischemic heart disease and venous thromboembolism. Blood group O is associated with breast cancer, cholera, and gastrointestinal (GI) infection by *Escherichia coli* and GI ulceration.^[15–17] Hadeal and Ali^[18] showed that blood groups B and O⁺ are associated with diabetes mellitus and hypertension.

Behrman *et al.*^[19] reported that 30%–40% of infertile couples revealed ABO incompatibility. Allan^[20] found that there are no significant correlation between blood group ABO and human infertility. However, Ogbimi *et al.*^[21] reported that ABO compatibility and incompatibility did not reveal any statistically significant difference.

Conclusion

There was no significant correlation between the ABO blood group and infertility in male subjects. The prevalence of

Table 1: Comparison between the ABO blood group of infertile male (group A) and fertile male (group B) subjects

Blood group	Group A (infertile men), n (%)	Group B (fertile men), n (%)	Total (groups A+ B), n	χ^2	P	Significance
A	26 (29.54)	24 (27.27)	50	0.06	0.81	Not significant
B	17 (19.31)	20 (22.72)	37	0.38	0.54	Not significant
AB	09 (10.22)	05 (05.68)	14	0.60	0.44	Not significant
O	36 (40.90)	39 (44.31)	75	0.04	0.84	Not significant

blood group O is higher in infertile and fertile groups followed by blood groups A and B, whereas, the least prevalence was blood group AB. Large-scale studies are required to verify this correlation for appropriate intervention strategies. This observation could contribute to the field of andrology and for clinicians who are dealing infertility cases in men.

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