

## **The relation between ABO blood group and spontaneously repeated abortion**

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### **Abstract**

There is a strong relationship between ABO blood groups and repeated abortion and we do this study to find out this relationship. Sixty two couples from Tikrit city, suffering from spontaneous repeated abortion have been investigated for the ABO blood groups system to see the frequency of ABO blood group and ABO incompatibility as a cause of abortion and 50 couples were taken as control group. In husband group maximum number of individuals had blood group O. In wife group, also blood group O showed the highest number of individuals. The frequency of ABO blood group of husband/wife mating was highest in blood group A/B, and Lowest in blood group AB/AB. The large number of abortion group was from blood group O and the small number of abortion group was from blood group AB while in control group, blood group O shows high frequency and blood group AB show low frequency.

**Key words:** ABO, abortion, incompatibility

### **Introduction:**

In 1943, Levine had identified ABO incompatibility as a cause of early abortions and stillbirths. From this time onwards numerous workers produced data suggesting, mainly on the grounds of a deficiency of A children, and an excess of abortions, in the families of O women married to A men, that the A fetuses produced by such mating were especially liable to be aborted<sup>(1, 2, 3)</sup>

Although the relation of ABO blood group system to disease is well established, it may not be of great genetic importance, because the disease concerned usually affects people in middle or later life, after the peak reproductive period.

The relation of early abortion and ABO blood type incompatibility has been reported in some studies. The analysis of wife-husband joint ABO blood group distribution in couples with habitual abortions showed an excess of A compared with expected proportions assuming random mating<sup>(2, 3, 4)</sup>

Levine and Rosenfield then give a highly critical and detailed analysis and recalculation of all available published data on the ABO groups of parents and offspring. Most of the information on possible loss of children from materno-fetal incompatibility can be derived from the frequencies of A and O children in A/O mating, comparing those

mating where the mother is O with those where she is A. The combined data show a significant deficiency of 25% of A children in the incompatible mating. Other mating, involving B, are less conclusive because of small numbers, but the overall conclusion is that 'there is a loss of between 14% and 32% of all A or B children from mating of an A, B (and presumably AB) father and an O mother, as compared with the reciprocal mating, and that the most likely value for this loss is 25%. Some authors suggest that ABO-related infertility be due to the action of antibodies, in the secretions of the mother's genital tract, on incompatible spermatozoa. It is difficult to explain the marked discrepancies between the results of the different infertility studies, and there is a need for further data<sup>(4, 5)</sup>

The papers cited above show, on the whole, very strong evidence that in mating where the husband has an A antigen which the wife does not possess, there is a marked selection against the birth or survival of A (i.e. heterozygous) offspring. In a study by nunzio botiny et al, the possible differential effects of A and B blood group materno-fetal incompatibility on human fertility through a comparative analysis of couples with recurrent spontaneous abortion (RSA) and healthy mothers in two populations (Rome & Sassari) has been reported. A low number of "B" incompatible mother (women) A/infant

(husband) B in RSA couples and a high number of "B" incompatible in healthy mothers was observed. The phenomenon is much more evident in women aged 24-28 years, a period of maximum fecundity<sup>(1, 5, 6)</sup>

Relationships between maternal-fetal ABO compatibility and both human fertility and fetal growth parameter have been observed [7,8]. It may be better to investigate the possibly different roles of anti-A and anti-B antibodies in repeated abortion patients and in normal groups, especially because Bakacs et al., suggest different complement-binding capacities between anti-A and anti-B monoclonal IgM antibodies<sup>(9,10)</sup>. It is possible that anti-B immunoglobulins could have, at least in some mother-infant joint types, a specific protective effect against abortion<sup>(10, 11)</sup>.

The aim of the study is to find out whether there is any correlation between ABO blood groups and spontaneously repeated abortion

## **Material and Methods**

The present study was done at Tikrit teaching hospital from 1/ may/2007 to 28/Feb./2008. Sixty two women with history of spontaneously repeated abortion with there husband (mixed) were tested by ABO blood group at laboratory department at Tikrit Teaching hospital. Any women without her husband excluded from the study.

Fifty normal women with there husband (mixed) were tested by ABO blood group at laboratory department at Tikrit Teaching hospital. Any women without her husband also excluded from our study.

All the blood samples were tested immediately after collection. The principle of ABO grouping is based on a specific agglutination reaction between antigens on the red cells and IgM antibodies in the typing serum .The antisera used for blood grouping in this study were provided by monosera, which give more specific reactions and are very sensitive for weaker reaction<sup>(1,4)</sup>

## **Results**

In our study 62 couples have been investigated for the ABO blood group incompatibility to see if the frequency of specific ABO blood types in these patients

has any effect in their repeated abortion. Two mode of analysis has been used, one is the individual ABO blood group to evaluate the frequency of each blood groups in each category (male, female and mix), and the second one is the joint ABO blood group mating between husband and wife.

Table 1 show, the highest frequency of blood group was blood group O (husband, wife and mixed) the lowest frequency of blood group was blood group AB (husband, wife and mixed).

While, table 2 shows the frequency of ABO blood group of husband/wife mating was highest in blood group A/B , and Lowest in blood group AB/AB .However, table 3 show the highest number of abortion group was from blood group O and the lowest No. of abortion group was from blood group AB. In addition to, the highest number of control group was from blood group O and the lowest number of control group was from blood group AB.

The second group in frequency in aborted group was blood group B while in normal group was blood group A.

## **Discussion**

ABO blood group system is one of the most commonly used factor in different investigation especially in human population genetics for its important role and easy availability as compared with other tissues of the human body<sup>(1)</sup>

We agree with Ali Mohammed (study done in Ahvaz medical college in Iran) about the frequency of blood group AB was the lowest one.

In our study the most common blood group (mixed) was blood group O, this is not similar to study done by Ali Mohammed in which the most common blood group was blood group A and this is may be due to differences in the communities.

Our study agree with previous studies<sup>(1, 4, 6)</sup>. In couples with repeated spontaneous abortion (RSA), it has recently been shown that there are a high number of A incompatible couples (i.e., husband possessing A specificity of ABO system and mother possessing anti-A immunoglobulin types and a low number of B incompatible couples with respect to reciprocal mating types (4, 6).

Most of the differences between A and B incompatibility observed in RSA couples are due to a decreased proportion of couples characterized as wife A/husband B (B incompatible) with respect to reciprocal mating type, which would be wife B/husband A (A incompatible) <sup>(6)</sup>.

The joint ABO bloods group of husband/ wife mating in RA patient of this study also shows an increase toward A/B and A/O individuals. In this type of analysis, most of the couples had A/B and A/O (husband/wife) joint blood group mating. In both of these joint blood groups, husbands have A phenotype and therefore have an antigens which is not present in wife's RBCs. Ali Mohammed study in 2004 and another study by Lucarini and Nicotra in 1995, the analysis of husband/wife joint ABO blood group distribution in couples with habitual abortion, an excess of A compared with expected proportions assuming random mating have been reported which agree with our analysis <sup>(4)</sup>.

Our study agree with previous study done by Ali Mohammed (2004), and Bhattacharjee PN (1961) in which the blood group O (mixed) was the highest in normal and abortion group, and the blood group AB(mixed) was the lowest one in both normal and aborted group.

Blood group substances could play an important role in the organization of cell membrane structure and expression of membrane protein <sup>(8)</sup> Genetic polymorphism of blood groups might influence the function of proteins involved in substrate transport and signal transduction <sup>(9)</sup>. On the other hand, maternal-fetal differences in membrane transport and signal transduction of growth factors could affect intrauterine development and survival <sup>(10)</sup>.

Thus, maternal-fetal differences in ABO membrane protein structure, which is originated from wife/husband differences, could be involved in the maternal-fetal biological competition by mechanisms different than those implicated in classical immunological phenomena. The long evolutionary history of ABO and H structures, present in the cell membrane long before the appearance of immunological phenomena, argues in favor of this possibility <sup>(11)</sup>.

According to this result, we recommended that ABO blood group system should be included in future investigations related to spontaneous repeated abortion.

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**Table 1:** frequency of ABO blood group in spontaneous repeated abortion

Blood group	Husband	Wife	Mixed
A	17	14	31
B	14	20	34
AB	12	7	19
O	19	21	40
Total	62	62	124

**Table 2:** Frequency of ABO joint blood group according to husband/wife mating

Sr.number	Joint blood group	No. of couples
1	A/A	6
2	A/B	13
3	A/O	10
4	A/AB	5
5	B/B	3
6	B/O	8
7	B/AB	4
8	O/O	9
9	O/AB	2
10	AB/AB	1
Total		62

**Table 3:** Comparison of ABO blood group frequency between repeated abortion and normal cases.

Sr. No.	Blood group	Normal group	Abortion group
1.	O	41	38
2.	A	29	33
3.	B	20	34
4.	AB	10	19
Total		100	124