The ASSOCIATION BETWEEN ABO BLOOD GROUP AND SPONTANEOUS ABORTION

Khalid Gata Washeel Al-Fartosi
Department of Biology , College of Education , University of Thi-Qar , Iraq

ABSTRACT

A study had been carried out to determine the association between ABO blood group and spontaneous abortion. One hundred two couples from Al-Nassiriyah City (Iraq),sustained repeated abortion had been investigated for the ABO blood groups to find the frequency of ABO blood group phenotypes .In husbands group, the maximum number of individuals had blood group B. In wife group, blood group A was the highest among all individuals. In mixed group 204 individuals had been tested and out of these, again blood group A shows the highest number of individuals. Blood group A was higher in individuals and mixed groups as compared with normal group in this study. This study came to a conclusion that there is a clear increase in number of individuals for blood group A in-patients with repeated abortion, and this factor may need to consider in future investigations.

Key Words: Blood group, Abortion.

الترابط بين فصائل الدم والإجهاض التلقائي

خالد كاطع وشيل الفرطوسي
قسم علوم الحياة / كلية التربية / جامعة ذي قار / العراق

الخلاصة :

تخصصت هذه الدراسة لبحث العلاقة بين فصائل الدم والإجهاض التلقائي. اشتملت الدراسة على 102 عينة من الازواج المشخص لديهم حالات الإجهاض المتكرر من مدينة الناصرية / العراق وملاحظة تكرار فصائل الدم لديهم . اظهرت النتائج ان المجموعة الدموية **B** كانت هي الأعلى في تكرار الحالات المدروسة من الازواج , بينما المجموعة الدموية A كانت هي الأعلى لدى النساء (الزوجات) . اظهرت النتائج كذلك ان الفصيلة الدموية A كانت هي الأعلى ايضا في المجموعة المختلطة التي تشتمل على الازواج والزوجات. ان الفصيلة الدموية A هي الاعلى لدى الافراد والمجموعة المختطلة عند مقارنتها مع المجموعة الطبيعية. الدراسة الحالية استنتجت زيادة واضحة في عدد حالات الإجهاض لحاملي الفصيلة الدموية A .

INTRODUCTION

Compared to the general population , a higher frequency of spontaneous abortion has been observed in infertile couples , as well as a high prevalence of infertility among repeated spontaneous aborters (Coulam , 1992). Spontaneous

abortion has been attributed to several factors involved in human reproduction . Genetics , uterine abnormalities , endocrine and immunological dysfunctions (Christiansen , 1996) , infectious agents , environmental pollutants , psychogenic factors (Rock and Zacur , 1983) and endometriosis (Dicker *et al.* , 1992) are the most important known causes of spontaneous abortion .

The male factors , i.e. sperm quality , chromosomal anomalies , paternal age and exogenous toxic factors are rarely discussed in repeated spontaneous abortion (RSA). However , it appears that , whatever the origin of RSA (constitutional chromosomal , sperm quality or environment) , paternal factors are involved in certain cases of RSA.In 1943 , Levine had identified ABO incompatibility as a cause of early abortions and stillbirths . From that 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 (Thompson and Thompson , 1986 ; Han and Yan , 1993) . Although the relation of ABO blood groups system to disease is well established , it may not be of great genetic importance, because the disease concerned usually affect people in middle or later life, after the peak reproductive period (Malekasgar,2004) .

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 (Lucarini *et al.* , 1995) .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% (Mourant , 1977) . 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 (Mourant , 1977).

Relationships between maternal-fetal ABO compatibility and both human fertility and fetal growth parameters have been observed (Satyanarayana *et al.* ,1978; Hoff and Bixler , 1986) .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 , specially because Bakacs et al. suggested different complement-binding capacities between anti-A and anti-B monoclonal IgM antibodies (Bakacs *et al.*,1993 a,b) . It is possible that anti-B immunoglobulins could have , at least in some mother – infant joint types , a specific protective effect against abortion (Mollnes *et al.* , 1998) .

The present study was designed to investigate the correlation of ABO blood groups and spontaneous abortion in Thi-Qar province population / South of Iraq.

MATERIALS and METHODS

One hundred two couples suffering from repeated abortion who were collected from the hospital of lactation and children in Al-Nassiriyah city / South of Iraq had been investigated for the ABO blood groups system to find the frequency of ABO blood group phenotypes. Four hundred seventy six of normal couples who were visited the center of ABO blood group examination in the same city were used as a control group. For determination of A, B, O and AB blood groups, a drop of blood was mixed with antisera, and agglutination was observed within two minutes (Wazirali *et al.* , 2005).

RESULTS

In the present study 102 couples had been investigated for the ABO blood group incompatibility to see if the frequency of specific ABO blood types in these patients have any effect in their repeated abortion . One mode of analysis has been used which is the individual ABO blood group to evaluate the frequency of each blood groups in each category (male, female and mixed) .

Patients have been divided into two groups of husband and wife for individual ABO blood group analysis . Out of 102 husbands 31 individuals (30.39%) had blood group B ; the next were the individuals of A blood groups with 28 individuals (27.45%). Twenty-three individuals also had blood group AB (22.54%) and finally 20 individuals had blood group O ,which account for (19.60%) (table 1) .

In wife group the highest blood group was A with 36 patient (35.29%) . The second highest blood group was AB with 23.52% (24 individuals) and the next was blood group B with 22 individuals (21.56%) , and the last one is the O with 20 individuals(19.60%) (table 1) .

In the mixed group (husband + wife) 64 individuals (31.37%) had blood group A . 53 individuals (25.98%) had blood group B. Forty - seven individuals (23.03%) had blood group AB , and 40 individuals (19.60%) had blood group O (table) .

The blood group of the patients in this study has been compared with control group .Blood groups of four hundred seventy six couples who were recorded in summer center / Nassiriyah / Thi-Qar / Iraq have been compared with the patients of this study (table 2) .

Table (2) shows the comparison of a normal group with our repeated abortion patients. In this control group of 476 individuals , the blood group O shows the maximum number of individuals with 38.31% . B type individuals stand second with 28.63 % and A type account for 25.26 % next to these two , while AB type was 7.78 % (figure 1).

Table 1 : ABO blood group frequency in repeated abortion cases .

Blood group	Husband	Percent %	Wife	Percent %	Mixed	Percent %
A	28	27.45	36	35.29	64	31.37
B	31	30.39	22	21.56	53	25.98
AB	23	22.54	24	23.52	47	23.03
O	20	19.60	20	19.60	40	19.60
Total	102	100	102	100	204	100

Table 2 : Comparison of ABO blood group frequency between RA and normal cases .

Normal group (Mixed)				RA cases (Mixed)			
Sr.No	**No. of case**	**Blood group**	**Percentage %**	**Sr.No**	**No. of case**	**Blood group**	**Percentage %**
1	**120**	**A**	**25.26**	**1**	**64**	**A**	**31.37**
2	**136**	**B**	**28.63**	**2**	**53**	**B**	**25.98**
3	**038**	**AB**	**07.78**	**3**	**47**	**AB**	**23.03**
4	**182**	**O**	**38.31**	**4**	**40**	**O**	**19.60**
Total	**476**		**100**		**102**		**100**

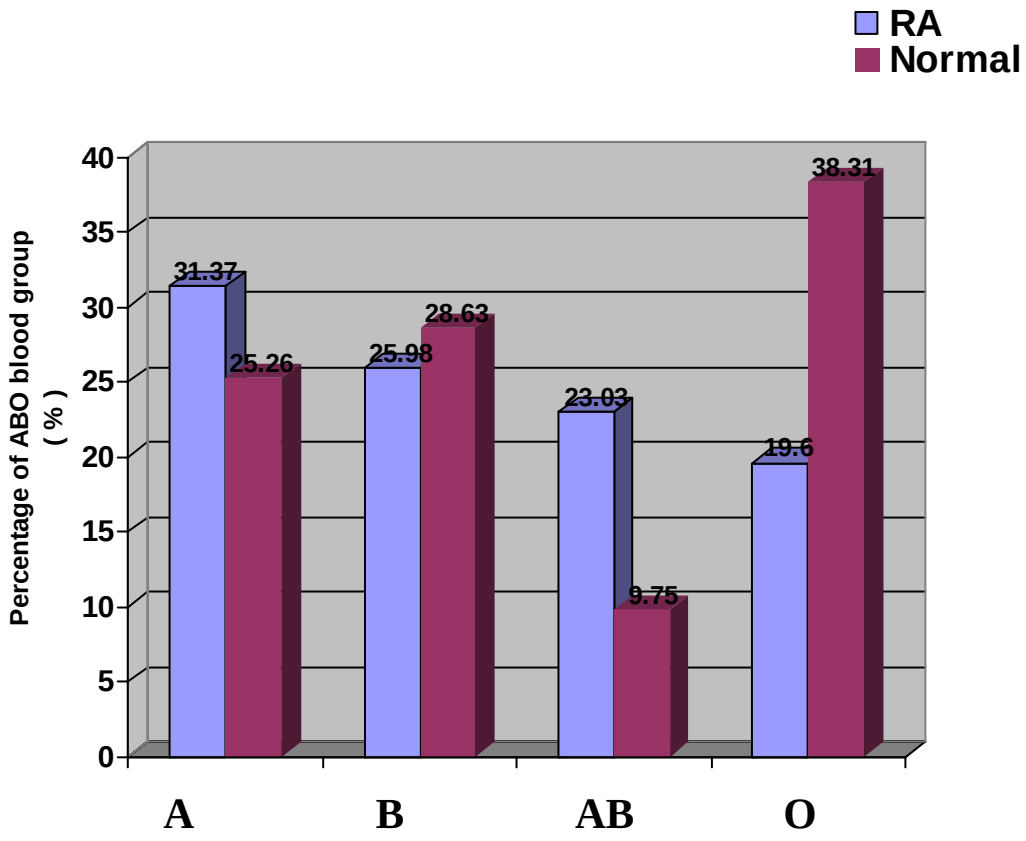

Figure (1) :- Percentage of ABO blood group in RA and normal cases

Discussion

Research on ABO blood group system has been of immense interest, due to its medical importance in different disease. The ABO Blood group system is not only important in blood transfusions, cardiovascular diseases, organ transplantation, erythroblastosis in neonates, but also one of the strongest predicators of national suicide rate and a genetic marker of obesity (Molison , 1979 ; Komar *et al.* , 1993 ; Shamim , 2002 ; Egawa *et al.* , 2004 ; Hein *et al.* , 2005 ; ; Lester , 2005) . 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 (Malekasgar , 2004).

In couples with repeated spontaneous abortion (RSA), it has 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 type (Lucarini *et al.* , 1995 ; Bottini *et al.* , 2001). Most of the differences between A and B incompatibility observed in RSA couples characterized as wife A/husband B (B incompatible) with respect to reciprocal mating type , which would be wife B/husband A (A incompatible) (Bottini *et al.* , 2001) .

In clinical practice the term ABO incompatible refers to a couple in which the fetus has an antigen not present in the mother. In the present case it means that the mother has antibodies against such an antigen and she is able to damage the fetus. Fetal loss and hemolytic disease of the new born may result from such a situation (Cohen, 1970) .

The present study shows that blood group B are the highest blood group in husbands (A/incompatible) group. In females the highest blood group was A and in mixed group type A shows the highest number of individuals. Therefore, a clear increase in type A in wife and mixed group can lead us to consider the difference and this can result in an increase in incompatibility between husband/wife and may affect the fetus (Malekasgar , 2004). Unfortunately we have not studied the abortuses or children of these patients to find out the blood group incompatibility in them, but other studied have reported an increase of A and B incompatibility when compare the mother child joint ABO type (Bottini *et al.* , 2001).

A comparative study of blood group of different normal populations of Al-Nassiriyah city with RA patient's of this study conforms that the blood group A is increased in patients of repeated abortion. In another study by Malekasgar (2004), the results of increased of blood group A and blood group AB in RA patient's were agree with our results. Many previous studies that they referred to A blood group was higher incidence to breast cancer than other groups (Anderson and Hass,1984 ; Barua *et al.* , 2002 ; Mehdi *et al.* , 2007).

Blood group substances could play an important role in the organization of cell membrane structure and expression of membrane protein (Agree and Cartron , 1991). Genetic polymorphism of blood groups might influence the function of proteins involved in substrate transport and signal transduction (Devynck , 1995). On the other hand, maternal-fetal differences in membrane transport and signal transduction of growth factors could affect intrauterine development and survival (Bottini *et al.* , 1998). 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 (Vogel and Motulsky , 1986).

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