

Case Report

Double rare ABO blood group inheritance

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Abstract

Blood group system ABO phenotype Oh Bombay detected while cross-matching with different donors and by the by, family screening leads to a unusual matting result when mother AB and father O.

Detail description

One Mrs. Reba Khatun aged about 22 years admitted to the Dept. of Gynecology & Obstetrics on 21 February 2008 for missed abortion. She lost her 1st, 2nd and 3rd conception before due time at home. During 4th gravida on periodic follow-up, she was found anemic and advised for blood transfusion. Her routine blood grouping suggested blood group O and Rh-D positive. Her father, who was also O Rh-D positive, was ready to donate blood, but major side compatibility test i.e., donor's red cells with recipient's serum found mixed field and so commented incompatible. Six of her near relatives with same blood group and type failed to show compatible.

Investigations and results

Her red cells washed and retested with anti-A, anti-B and Anti-AB as well as serum with A-antigen, B-antigen and O-antigen. Result noted bellow,

	Anti-A	Anti-B	Anti-A,B
Pts red cells	NA	NA	NA

NA=Not agglutinated

	A-cell	B-cell	O-cell
Pts serum	A	A	Mixed field

A= agglutinated

Mix field confused for presence of alloimmunisation but Indirect Coomb's Test showed no remarkable distinction. For further investigation her cells tested against anti-H, found no agglutination. On detail serological study blood samples of her family members were send to the Department of Transfusion Medicine, BSMMU for confirmation of very rare so called BOMBAY phenotype. It can easily be detected in the laboratory, it fails to react either with anti-H or lectin extract from *Ulex Europeanus* secd. It is mainly found among the Marathi speaking people in Bombay region, India.

Discussion

Anti-H is a naturally occurring IgM cold agglutinin that reacts below room temperature though it is an insignificant and no reactivity at 37°C. The inheritance of H-gene is independent of ABO gene but ABO antigens are formed from the same basic precursor materials. The H-gene is very

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common in the random population but its allele h is very rare and genotype hh rarest, no doubt which lack normal expression of ABO gene. On seeking the pedigree of her family parents the following data collected There is now evidence of a fourth

allele, the compound AB along with. It is postulated that a precursor substance acted upon by a series of genes. The rare cis-position refers to the inheritance of both AB gene from one parent carried on one chromosome and an O gene from

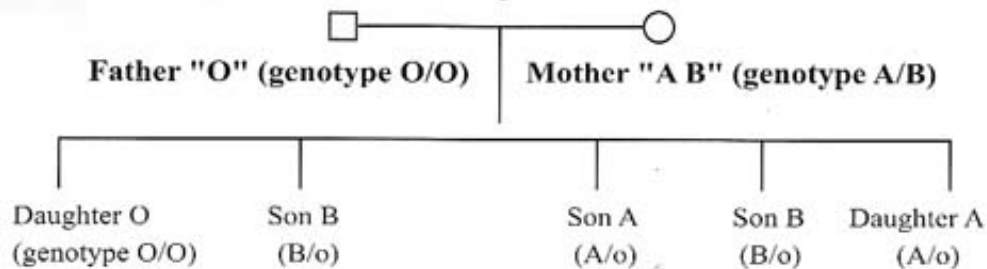
Fig-1

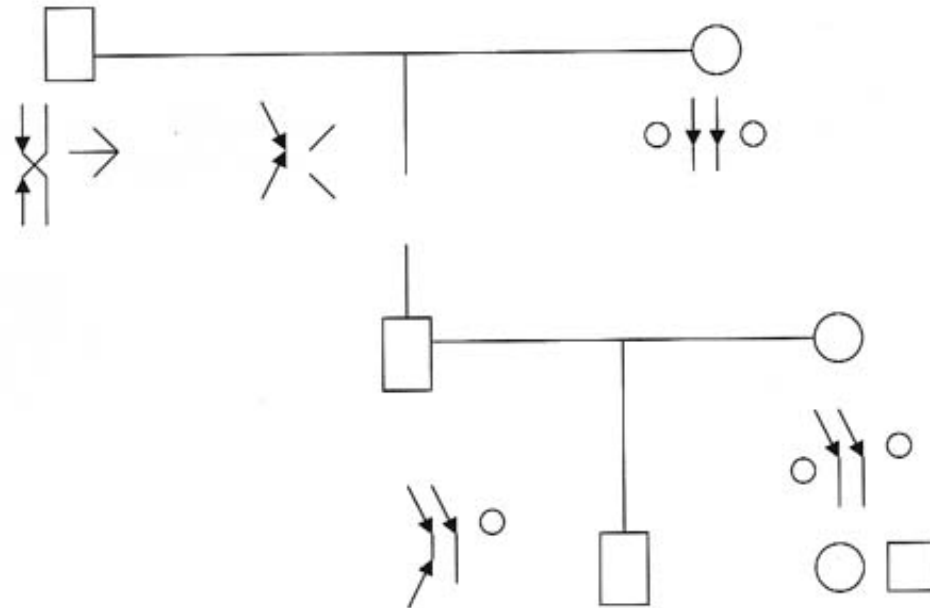
Substance	Gene	Substance	Gene	Antigen
P.S			AO, AA - - - -	A, H
	HH	H	BO, BB - - - -	B, H
	Hh		AB - - - - - -	A, B, H
			OO - - - - - -	H
	hh - - - - -	P.S	AO, AA - - - -	
			BO, BB - - - -	Not detected
			AB, OO - - - -	

(PS - precursor substance)

Fig-1 showing the genetic pathway leading to the A, B and H antigens (From Bangladesh medical research council bulletin vol. XVI no2.

Fig-2





Various hypotheses have been offered to explain the cis-AB phenotype. Many favours a crossing over a portion of a gene resulting in an equal expression by recombinants.

For academic interest details with multiple pictures written below -

Ulex europaeus other name furze, Gorse, Whin. It is leguminosae deciduous suitable for large scale ground cover, origin from western Europe, UK.

Flowers are lemon yellow mainly late spring. Tolerates - 15oC, spines make stems very difficult to handle (80

cm-1 m height). Nursery production from seeds or semi-ripe cutting taken early summer.

References

1. Modern blood banking and transfusion practices 3rd Ed by Denies M.Harmening p- 100
2. Mollison P.L., Blood transfusion in clinical medicine 9th Ed. Blackwell scientific publications, Oxford, p- 267
3. Bangladesh Medical Research Council Bulletin Vol.xvi No.-2. December-1990, p-79.