IJBC 2018; 10(2): 61-63

Iranian Journal of Blood & Cancer

Journal Home Page: www.ijbc.ir



CASE REPORT

Discrepancy in ABO Blood Grouping in a Blood Donor: A Case Report

Saylan Mohammadi[1,2], Mostafa Moghaddam[2], Serveh Babahajian[1,2], Mohammad Saied Karimian[1,2], Shirin Ferdowsi[2*]

[1]Kurdistan blood transfusion Center , Sanandaj, Iran
[2]Blood Transfusion Research Center, High Institute for Research and Education in Transfusion Medicine, Tehran, Iran

ARTICLE INFO

Article History:
Received: 06.01.2018
Accepted: 03.03.2018

Keywords:
Discrepancy
Blood grouping
B subgroup
Forward typing
Reverse typing

**Corresponding author:*
Shirin Ferdowsi,
PhD of Hematology, Blood Transfusion Research Center, High Institute for Research and Education in Transfusion Medicine, Tehran, Iran
Tel: +98 87 88601501
Fax: +98 87 88601555
Email: ferdowsishirin@gmail.com

ABSTRACT

Detection of ABO blood groups through agglutination is the basis of pre-transfusion testing. However, weak agglutination reactions may be obtained with reagent antibodies and are a result of weak expression of A and B antigens on red blood cell surface which may cause a discrepancy in blood group typing. Here, we report a donor which showed discrepancy between red blood cells (forward) and serum (reverse) typing. A detailed analysis revealed the blood type as a variant of blood group B. Subgroup of B is a very rare phenotype of blood. This is the first case ever detected in Kurdistan blood transfusion Center.

Please cite this article as: Mohammadi S, Moghaddam M, Babahajian S, Karimian MS, Ferdowsi S. Discrepancy in ABO Blood Grouping in a Blood Donor: A Case Report. IJBC 2018; 10(2): 61-63.

Introduction

ABO blood group is the first system of blood grouping that still remains the most important one in transfusion medicine. This is because of the regular occurrence of the antibodies; Anti-A, anti-B & anti-AB, which are capable to cause red blood cell (RBC) destruction in individuals whose red cells lack the corresponding antigens.[1] Most of the subgroups are often recognized when there is a discrepancy between red blood cells and serum grouping. Detection of a subgroup of blood group B is a very rare occurrence in the general population.[2] It is wrongly diagnosed as group O because the B antigen is very weakly present on RBC membrane and cannot be detected if weak anti-B serum is used in cell typing.[3] The weak B subgroups include Bm, B3, Bx and Bel. Bm cells are not agglutinated by anti-B; the B antigen is only detected by sensitive tests such as adsorption and elution of anti-B. B3 phenotype shows a mixed field of hemagglutination with anti-B. Bx red cells represent a weak agglutination by anti-B and weak anti-B is found in the serum. Bel is not agglutinated with anti-B, but is only adsorbed by anti-B.[1, 4] This is a report of a donor which showed discrepancy between red blood cells (forward) and serum (reverse) typing. Further analysis revealed the blood type as a variant of blood group B.

Case Presentation

The blood of a 46-year-old healthy male donor with unremarkable history for any disease and medication was analyzed for blood group determination. His RBCs showed

[Downloaded from ijbc.ir on 2026-11-12]

Table 1: Reaction of donor red blood cells and serum with antisera and cells incubated at different time and temperatures.

ABO							
	Forward			Reverse			
Temp. Incubation	**Anti-A**	**Anti-A,B**	**Anti-B**	**Al Cells**	**B Cells**	**Auto Control**	**ABO Int.**
RT (IS)	0	0	0	4+	0	0	Subgroup of B
C_4	0	W+	W+	4+	0	W+	
Adsorption & Elution technique	0	NT	4+	NT	NT	NT	
DAT Results IS/5' incubation	Ps1	Negative	DAT Intr.				Negative
	CC	√	Rh (D)				Positive
	Ps2	Negative					
	CC	√	Antibody screen				Negative

negative agglutination with anti-A, anti-B and anti-AB, while in his serum a potent anti-A at room temperature was detected. In order to resolve this discrepancy, blood was incubated with known antisera (including antisera of group B, group A, and group O) for varying time intervals at various temperatures. Incubating at low temperature enhanced the reaction of antibodies (A and B), mostly IgM isotype. The results are summarized in Table 1. Further evaluation was performed using the adsorption elution agglutination assay. The results indicated that the donor's blood group is a variant of B in ABO system, since the elution contained anti-B which confirmed the presence of antigen B on donor's RBCs.

Discussion

The risk of hemolytic transfusion reaction due to transfusion of ABO-incompatible blood is 100–1000 times higher than the risk of transfusion-transmitted infections (TTIs), and such a reaction may lead to serious consequences in the recipient.[2] Here, we reported a case of B subgroup in a blood donor diagnosed through discrepancy between forward and backward typing. Weak subgroups of 'B' are highly uncommon and require advanced techniques like 'Adsorption and Elution' for their detection. Molecular testing is usually required for confirmation and exact typing of the subgroups. This subgroup has high frequency among blood donors in some countries ranging from 1 in 8885 in India to 1: 116 667 in France.[2] In the literature we found several case reports. In a study by Kaur et al. in India, weak blood group; B subgroup was found in five blood donors (2 cases of Bm, 1 case of B3, 1 case of Bx and 1 case of Bel).[2] In another study from India by Sharma et al. two cases with subgroups of B were reported.[5] In a study by Khan et al. a B variant phenotype in a healthy male donor was reported from Pakistan. [6] In another report by Khatun et al. a case of B subgroup (Bx) was reported in a patient undergoing cardiac surgery in Bangladesh.[7] In addition, Chaurasia et al. reported three cases and Makroo et al. reported two cases of subgroup of B.[8, 9] In Iran we only found a case of blood group B subgroup from Isfahan province.[10]

Conclusion

Individuals with discrepancy between forward and reverse typing should warn both the laboratory and physicians of the probability of weak expression of blood group antigens. When these individuals present as transfusion recipients, they should be transfused with group 'O' red cell components and should receive group matched/compatible plasma and platelet components.

Acknowledgment

The authors acknowledge blood transfusion research center, High institute for research and Education in Transfusion Medicine, Tehran, Iran and Kurdistan Blood Transfusion Organization, Kurdistan blood transfusion Center, Sanandaj, Iran.

Conflict of Interest: None declared.

References

1. Watkins WM. The ABO blood group system: historical background. Transfus Med. 2001;11(4):243-65. PubMed PMID: 11532183.
2. Kaur G, Kaur P, Basu S, Kaur R. Blood group discrepancies at a tertiary care centre - analysis and resolution. Int J Lab Hematol. 2014;36(4):481-7. doi: 10.1111/ijlh.12176. PubMed PMID: 24325154.
3. Yamamoto F, Clausen H, White T, Marken J, Hakomori S. Molecular genetic basis of the histo-blood group ABO system. Nature. 1990;345(6272):229-33. doi: 10.1038/345229a0. PubMed PMID: 2333095.
4. Lee AH, Reid ME. ABO blood group system: a review of molecular aspects. Immunohematology. 2000;16(1):1-6. PubMed PMID: 15373627.
5. Sharma T, Garg N, Singh B. ABO blood group discrepancies among blood donors in Regional Blood Transfusion Centre GTB Hospital, Delhi, India. Transfus Apher Sci. 2014;50(1):75-80.
6. Khan MN, Khan TA, Ahmed Z. Discrepancy in ABO blood grouping. J Coll Physicians Surg Pak. 2013;23(8):590-2. doi: 08.2013/JCPSP.590592. PubMed PMID: 23930880.
7. Khatun A, Biswas J, Habibullah MM, Islam A, Shill N, Rahman A, et al. B subgroup: Bx blood group in a patient: A case report. Bangabandhu Sheikh Mujib Medical University Journal. 2012;5(1):81-2.
8. Chaurasia R, Rout D, Dogra K, Coshic P, Chatterjee K. Discrepancy in Blood Grouping: Subgroups of B—Challenges and Dilemma. Indian J Hematol Blood Transfus. 2017;33(4):628-9. doi: 10.1007/s12288-017-0788-x. PubMed PMID: 29075085; PubMed Central

[Downloaded from ijbc.ir on 2026-11-12]

PMCID: PMCPMC5640541.
9. Makroo R, Chowdhry M, Bhatia A, Gupta R, Rosamma N, Phillip J. Two case reports of rare weak 'B'subgroup detected during routine testing. Apollo Medicine. 2010;7(3):217-9.
10. Rahgozar S, YAVARI F, Hariri M, Moafi A. ABO discrepancy prevalence and qualitative study of relevant factors in blood donors of Isfahan Regional Blood Transfusion Center. The Scientific Journal of Iranian Blood Transfusion Organization (Khoon). 2006;3(1):53-61.

[Downloaded from ijbc.ir on 2026-11-12]