

Letter to the Editor

Importance of including O cells in reverse grouping in detection of Bombay phenotype (O_h)

Dear Editor ,

Abstract

Background: Bombay blood group is the most frequently asked rare blood in India. It is characterised by absence of normal ABH antigens and have corresponding antibodies in serum. This blood group is suspected when reagent O cells show agglutination in reverse or back typing or during antibody screening. We present a case of Bombay phenotype which was initially mistyped as O group.

Methods: Patient was having Iron deficiency anaemia and presented to our centre with signs and symptoms of anaemia. Two units of packed red cells were requested by physician. On routine typing strong reaction with O cells in reverse grouping and pan-reactive picture on antibody screen, which led to the suspicion of O_h phenotype.

Results/conclusions: We report a case of Bombay blood group referred to our centre which was managed successfully by contacting voluntary donor through rare donor registry. We highlight the importance of following standard protocol for proper pre-transfusion testing including blood grouping and also close coordination among blood banks across the country.

"Bombay phenotype" (h/h, also known as O_h) is a rare blood group found in 1 of 7,600 individuals in India and 1 in a million people in Europe (1, 2). O_h phenotype lacks all ABH antigens and possesses naturally occurring antibodies to A, B and H antigens. During ABO typing, these individuals type as group O. The O_h phenotype becomes apparent during antibody detection tests or during reverse typing which includes testing with reagent "O" reagent red cells. The anti-H present in O_h individuals strongly agglutinates all

group "O" red cells (rich in H antigens). The O_h phenotype is confirmed by demonstrating absence of H antigen on red cells and presence of anti-H in the serum. Anti-H present in these individuals is predominantly of IgM type that can bind complement and cause immediate RBC lysis. If a laboratory misinterprets this rarely encountered blood group which looks like O blood group on simple grouping and issues "O" blood to these patients, acute haemolytic transfusion reaction is inevitable.

A 22 year female, known case of Iron deficiency anaemia (IDA) was referred to our centre with complaints of increasing weakness, easy fatigability and difficulty in breathing. On examination, patient had marked pallor, tachycardia and was dyspnoeic. Her ECG was normal. CBC showed Hb-2.8 g/dl, HCT-14% and Reticulocyte count 12%. Iron studies were consistent with diagnosis of IDA (S.Iron 20 μ g/ml, S. ferritin 3.61ng/ml, TIBC 496 μ g/dl). Peripheral blood smear showed microcytosis and polychromasia. Osmotic fragility and G6PD tests were normal. Blood group was O Rh (D) positive. On enquiry patient revealed history of transfusion attempt thrice in a local hospital, each time resulting in immediate stopping of transfusion due to transfusion reaction and was thus referred to our centre.

In view of her clinical status, 2 units of RBC were requested. On routine typing technician observed strong reaction with O cells in reverse grouping and pan-reactive picture on antibody screen, which led to the suspicion of O_h phenotype. On further immunohematological workup with extended panel it was found to be a case of O_h (Table 1).

Since our inventory was not having Bombay blood group we asked the relatives of the patients to get their blood group checked. Her younger sister was found to be O_h phenotype but was not eligible for donation (weight-42kg and Hb-10.8g/dl).



Anti - A	Anti -B	Anti -H	A cell	B-cell	O-cell	Anti -D1	Anti -D2
0	0	0	4+	4+	4+	2+	2+
Interpretation: O_h Rh (D) positive (Bombay phenotype)							

Table 1 : Blood group of the patient

In our own rare donor registry two donors were contacted, but they were nonresponsive. Thereafter all blood banks in region were contacted for the availability and thankfully, one of the hospitals which maintained the registry of rare donors arranged a unit immediately. We further confirmed the blood group of the unit during pretransfusion testing and Cross-matching was performed by Gel cards (DiaMed, Switzerland). The compatible unit was safely transfused to the patient without any untoward event and with expected increment of haemoglobin. Later on saliva grouping was performed and the patient was found to be nonsecretor (*sese*), thus ruling out parabombay subtype. The physician in-charge was also communicated about the rarity of the blood group and told to consider other alternatives.

Bombay blood group is the most frequently asked rare blood in India and it is difficult to keep up with its supply. Case reports have been published by Sprawka *et al.* and Katz *et al.* describing management of Bombay blood group pregnancy by red cell apheresis(3, 4). Schricker *et al.* reported successful autologous transfusions in a patient undergoing heart surgery with Bombay blood group (5). Through this case report, we highlight the importance of including "O" cells in reverse grouping for detection of O_h phenotype which was initially missed by another centre and was attempted to transfuse O Rh (D) positive blood and resulted in acute transfusion reaction. Our patient was lucky in the regard that her Bombay blood group was determined optimally and timely and she received blood transfusion by an altruistic voluntary blood donor. Thus through this case we would like to emphasize on performing and interpreting blood grouping and pretransfusion testing using standard protocol in order to prevent serious adverse events and also the need for close coordination among blood banks especially for a rare blood group.

References

1. Bhatia HM, Sathe MS. Incidence of 'Bombay' (Oh) Phenotype and Weaker Variants of A and B Antigen in Bombay (India). *Vox Sanguinis*. 1974;27(6):524-32.
2. Dean L. The Hh blood group. 2005 28.8.14. In: *Blood Groups and Red Cell Antigens* [Internet]. Bethesda: National Center for Biotechnology Information (US). Available from: <http://www.ncbi.nlm.nih.gov/books/NBK2268/>.
3. Sprawka N, Young C, O'Brien B. Bombay blood type and use of red cell apheresis during pregnancy. *Obstet Gynecol*. 2011;117(2 Pt 2):463-5.
4. Katz AR, Ali V, Ross PJ, Gammon E. Management of a rare blood type: Oh "Bombay" in pregnancy. *Obstet Gynecol*. 1981;57(6 Suppl):16s-7s.
5. Schricker KT, Neidhardt B, Hacker R, Kail R. [Heart surgery in a female patient with blood group Oh (Bombay phenotype)]. *Dtsch Med Wochenschr*. 1983;108(2):61-3.

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