CASE REPORT

Pediatric patient with Bombay blood group: A rare case report

Sudeshna Bhar (Kundu), Anisha De, Anindita Saha, Chiranjib Bhattacharyya

Department of Anaesthesiology, Institute of Post Graduate Medical Education and Research, Kolkata, West Bengal, India

Address for correspondence:
Dr. Sudeshna Bhar (Kundu),
142, Bireswar Chatterjee Street,
Bally, Howrah - 711 201,
West Bengal, India.
E-mail: sudeshna04cmc@yahoo.co.in

ABSTRACT

Bombay blood group is a rare blood group in which there is the absence of H antigen and presence of anti-H antibodies. At the time of blood grouping, this blood group mimics O blood group due to the absence of H antigen, but it shows incompatibility with O group blood during cross matching. Serum grouping or reverse grouping are essential for confirmation of the diagnosis. Patients carrying this blood group can receive blood only from a person with this blood group. Reported cases of anesthesia in the pediatric patient with Bombay blood group are relatively rare. Here, we present successful anesthetic management along with intraoperative blood transfusion in a pediatric patient with Bombay blood group posted for ovarian cystectomy.

Key words: *Anesthesia, Bombay blood group, transfusion*

INTRODUCTION

Bombay blood group is a rare blood group with the incidence of about 1 in 10,000 in India and 1 in 10^6 in Europe.[1] It was first detected by Dr. Bhende in Bombay, India in 1952.[2] It occurs due to point mutation of the H gene. If the patient carries two mutant gene (H gene), then it will result in Bombay or Oh phenotype.

CASE REPORT

An 8-year-old female weighing 20 kg and belonging to American Society of Anesthesiologists physical status I was scheduled for right ovarian cystectomy under general anesthesia. On examination, she had mild pallor, pulse rate – 86/min, blood pressure – 110/76 mm Hg. Examination of airway and other systems revealed no abnormality. Blood examination showed hemoglobin 8.2 g%, total leukocyte count 7600/cmm, urea – 23 mg/dl, creatinine – 0.08 mg/dl. She had no past history of hospitalization and blood transfusion.

Access this article online	
Quick Response Code:	Website: www.saudija.org
	DOI: 10.4103/1658-354X.154738

One unit of whole blood was arranged for intraoperative transfusion. During grouping in the blood bank, her blood reacted like group O. However, the blood showed cross reaction with O group blood. This pointed toward the diagnosis of rare Bombay blood group. Diagnosis was confirmed by reverse grouping or serum grouping. Her parents and siblings were examined for the presence of Bombay blood group. But none of them were found to carry it. Blood was collected from one of the donors with this rare blood group enlisted in our institution, and it did not show any cross reaction with the patient's blood. This blood was preserved for intraoperative transfusion [Figure 1].

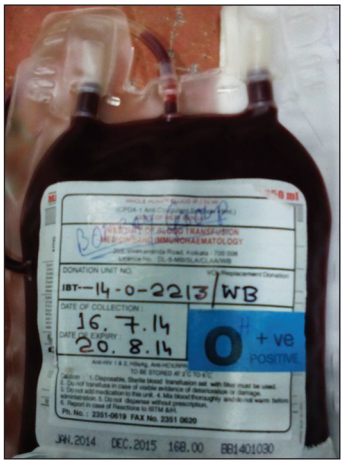

Figure 1: Whole blood of Bombay group used for intraoperative transfusion

In the operating room, patient was premedicated with injection glycopyrrolate 0.2 mg intravenous (IV) and injection fentanyl 40 mcg IV. Anesthesia was induced with injection propofol in titrated dose after proper preoxygenation. Trachea was intubated with cuffed endotracheal tube of 5.5 mm internal diameter after achieving adequate relaxation with injection vecuronium 2 mg IV. Anesthesia was maintained with nitrous oxide 66%, oxygen 33% and isoflurane 1–2% and intermittent doses of injection vecuronium 0.4 mg IV. Injection tramadol 40 mg IV and injection tranexemic acid 200 mg IV were administered. Intraoperative blood loss was about 150 ml. 200 ml of whole blood carrying Bombay blood group was transfused intraoperatively. Heart rate, noninvasive blood pressure, electrocardiography SpO_2, and $EtCO_2$ were monitored, and these parameters were within normal range. Neuromuscular blockade was reversed with injection neostigmine 1 mg IV and injection glycopyrrolate 0.2 mg IV. Trachea was extubated, and 100% oxygen was given for 5 min. Postoperative monitoring parameters were within normal limit. Patient was shifted to postanesthesia care unit. Postoperative period was uneventful. No further blood transfusion was needed. On second postoperative day, her hemoglobin was 9.2 g%. Eventually, she was discharged after 1-week. Her parents were advised to provide her an identity card mentioning the blood group.

DISCUSSION

Bombay blood group occurs due to point mutation of H gene. The mutant variety is known as h gene, which does not code for any protein. Thus, there is a lack of production of the protein named fucosyltransferase, coded by H gene. This protein catalyzes the addition of L-fucose to the precursor chain to form the H antigen. Thus, in patients with Bombay blood group, H antigen cannot be produced due to the absence of this protein. Normally, A and B gene specified products cause addition of N-acetyl galactosamine and D-galactose to the H antigen to form A and B antigens respectively. In the absence of H antigen, these reactions cannot take place. So, A and B antigens are not produced even if there is the presence of A and B gene. These persons are lacking A, B and H antigens in their blood, and consequently they produce anti-A, anti-B and anti-H antibodies. Absence of A and B antigens mimic O blood group. But, the presence of anti-H antibody causes cross reaction with all blood types including O group blood which carry H antigen. Hence, these patients can receive blood only from a person carrying Bombay blood group to avoid mismatched blood transfusion.[3]

There is another similar type of rare blood group known as para-Bombay in which there is a deficiency of H antigen, which can be diagnosed by reactivity with lectin *Ulex europaeus*. The person carrying this blood group also produces anti-H antibodies and show incompatibility with O blood group.[3]

The main therapeutic challenge in the patients with Bombay blood group is the arrangement of cross-matched blood due to very low incidence of this blood group in the population. A few cases have been reported where blood was arranged with difficulty from the neighboring states after few hours for transfusion in the emergency situation.[4,5] However, any fresh frozen plasma (FFP), platelets and cryoprecipitate can safely be transfused in these patients. One patient with hemodynamic instability and coagulopathy was managed with intraoperative crystalloid and colloid infusion as crossmatched blood was unavailable.[6] Coagulopathy was treated by transfusing six units of FFP. A few cases of transfusion reaction have been reported following transfusion of O group blood in patients with Bombay blood group.[7,8] Autologous blood transfusion is another suitable option in these patients to avoid problems associated with the arrangement of blood from healthy donors. A patient with para-Bombay blood group undergoing coronary artery bypass grafting was successfully managed with transfusion of one unit autologous blood intraoperatively and one unit autologous blood and one unit blood collected from his brother with the same blood group postoperatively.[9] However, autologous blood transfusion was not considered in our case as the patient had low hemoglobin.

Finally, it can be stated that before blood transfusion, only grouping is not sufficient. Cross matching is essential to identify this rare blood group. Reverse grouping or serum grouping should be performed to confirm the diagnosis. First degree relatives of the patient carrying Bombay blood group should be tested for the presence of this group, and the patient should carry an identity card mentioning the blood group for an emergency situation. Moreover, maintenance of rare blood group registry and cryopreservation techniques is essential for easy and fast arrangement of blood.

REFERENCES

1. Balgir RS. Detection of a rare blood group 'Bombay (Oh) phenotype' among the Kutia Kondh primitive tribe of Orissa, India. Int J Hum Genet 2005;5:193-8.
2. Bhende YM, Deshpande CK, Bhatia HM, Sanger R, Race RR, Morgan WT, *et al.* A "new" blood group character related to the ABO system. Lancet 1952;1:903-4.
3. Available from: http://www.austincc.edu/kotrla/bblec6ABOSPG05. [Last accessed on 2014 Sep 18].
4. Khan MQ. Bombay blood group: A case report. Pac J Sci Technol 2009;10:333-7.
5. Das S, Harendra KM, Anand R. Bombay blood a rare entity. J Clin Biomed Sci 2011;1:122-5.

6. Ali MA, Sohaib M. Emergency dilatation and curettage in a patient with Bombay blood group. J Coll Physicians Surg Pak 2014;24:603-5.
7. Shahshahani HJ, Vahidfar MR, Khodaie SA. Transfusion reaction in a case with the rare Bombay blood group. Asian J Transfus Sci 2013;7:86-7.
8. Malhotra S, Dhawan HK, Jain A, Sachdev S, Marwaha N. Acute hemolytic transfusion reaction in a patient with Bombay phenotype: Implications for ABO grouping. Indian J Hematol Blood Transfus 2014;30:108-10.
9. Jonnavithula N, Bonagiri S, Ramachandran G, Mishra R. Peri-operative red cell transfusion management in a rare H-deficient (Para-Bombay) blood group variant. Indian J Anaesth 2013;57:78-9.

How to cite this article: Bhar (Kundu) S, De A, Saha A, Bhattacharyya C. Pediatric patient with Bombay blood group: A rare case report. Saudi J Anaesth 2015;9:318-20.

Source of Support: Nil, **Conflict of Interest:** None declared.