Chest Heart Journal
Vol. 44, No. 2, July 2020

CASE REPORT

Management of "O" Positive Patient, Transfused with "B" Positive Blood – A Case Report

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Abstract:

The complications of blood transfusion are well known and at times is life threatening especially when it occurs due to accidental major mismatched blood transfusion. Here we present a case of a 32 years old lady who delivered a baby by LUCS. On her 3rd POD, she came to a tertiary level hospital with profuse per vaginal bleeding, breathlessness. She received an erroneous transfusion of group "B" Rh positive blood when her actual blood group was "O" Rh positive at a different hospital. She presented with features of DIC and acute renal failure. She was admitted to critical care unit- treated with broad spectrum antibiotics, forced diuresis with inj. Frusemide and eventually 3 sessions of hemodialysis were needed. As for transfusion, we decided to transfuse her with "O" Rh positive washed packed cell and "AB" Rh positive plasma which finally saved her life.

[Chest Heart J. 2020; 44(2) : 112-115]
DOI: http://dx.doi.org/10.33316/chab.j.v44i2.2019628

Introduction:

The ABO and Rh blood group system is the most important system which is followed prior to all blood transfusion.[1] Rhesus Blood Group system is the second most important blood group system followed during blood transfusion.[2] Blood group "O" is the commonest which is 37.12% of the world population, this is followed by "B" at 32.26%. "A" group comprises of 22.88% of the people and "AB" is the least prevalent group at only 7.74%. Similarly, out of the total donor population, 94.61% are Rh (D) positive whereas only 5.39% are Rh(D) Negative.[3]

A Blood transfusion reaction can be defined as any adverse effect or an undesirable and unintended occurrence during or after transfusion of blood component or products. These adverse effects may manifest as fever and can lead to more serious complications like renal failure, shock and even death. Transfusion of blood has been found to be a safe and effective way to correct haematological deficit. But at the same time it is also important that blood should be used in a judicious way and health care providers must be aware of the risks associated with Blood Transfusion.[4]

Case Summary:

A 32 year old female came to a tertiary level hospital complaining of severe breathlessness, profuse per vaginal bleeding, severe lethargy and altered consciousness on her 3rd POD of LUCS

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Submission on: 14 May, 2020 **Accepted for Publication:** 20 May, 2020
Available at http.//www.chabjournal.org

conducted at a local hospital in a remote area. She had already received 4 units of "B" positive whole blood on information provided by the patient's relatives, but no documented evidence was shown regarding the patient's blood group. On physical examination, she was pale. Her blood pressure was 80/50 mmHg and pulse rate was 110b/min. On auscultation, her lungs had bilateral basal crepitation. Her oxygen saturation was 92% on room air and her urine output was low. She was admitted to the ICU immediately and routine investigations were sent. The investigations revealed that her Hb% was 4.05gm/dl; WBC was 20000/mm^3 with 85% Neutrophils; ESR -145mm in first hour and platelets 60000/$mm.^3$ Her creatinine was 5.7mg/dl. Her APTT, FDP and Serum Fibrinogen were also markedly increased.

She was immediately started on broad spectrum antibiotics and advised for 3 units of packed cell transfusion. A requisition was given for "B" positive blood. The patient's blood was drawn for cross matching, but the sample was hemolyzed by the time it arrived to the lab. As a prerequisite of cross matching, the blood grouping of the donor and the patient were done. The donor's blood group reaction was "4+"agglutination ("B" positive), but the patient's blood group reaction was "1+" agglutination or mixed field reaction ("B" positive). Cross- matching with the donor's blood with the patient's turned out to be incompatible in both major and minor cross matching procedures. After several attempts to cross match, Coomb's test was done on the patient's sample. The Coomb's test was positive and there was evidence of hemolysis. At the same time Her LDH (lactate de hydrogenase) started to rise and was also several folds above the normal. And the sample tested revealed the blood group to be" B" positive (with mixed field reaction).

Meanwhile, the patient's condition deteriorated and decision was taken to transfuse her with "O" positive washed packed cell and "AB" positive plasma in order to maintain her hemodynamics. The next day, her creatinine shot up to 8.5mg/dl and a hemodialysis was arranged. After the dialysis, grouping was again done on her blood with a fresh sample. This time, on centrifuging the sample, the serum was clear with no signs of hemolysis. The blood group now revealed to be "O" Rh positive in both forward and reverse grouping tests.

The patient was transfused further with 3 units of "O" positive packed cell and 4 units of "AB" positive FFP. She underwent 2 sets of dialysis. Her condition improved gradually with other necessary supportive management. She was discharged with Hb%- 9gm/dl, creatinin-2.6 mg/dl, WBC- 11000/mm^3, Platelets- 150000/mm^4, lungs clear. Finally the patient's blood group was confirmed to be "O"-Rh positive.

Table-I

Blood group of the patient in the first sample

	Cell Groups			Rhesus Groups	Serum Groups		
Test substance	Anti A	Anti B	Anti AB	Anti D	A cell	B cell	O cell
Test results	__	± Mixed field reaction	+ Mixed field reaction	+	Not done	Not done	Not done

Table-II

Blood grouping of patient after hemodialysis.

	Cell Groups			Rhesus Groups	Serum Groups		
Test substance	Anti A	Anti B	Anti AB	Anti D	A cell	B cell	O cell
Test results	__	__	__	+	+	+	+

Discussion:

In ABO mismatched blood transfusion, two types of Acute Transfusion Reaction (ATR) occur:

A. Immunological reactions: Among the various acute immunological reactions like hemolytic, allergic, febrile non hemolytic, anaphylaxis and TRALI; only hemolytic transfusion reaction was seen in our case in spite of major mismatched blood transfusion.

B. Non- immunological reactions: Among the various acute non immunological reactions like marked fever with shock, congestive heart failure, air embolism, hypocalcaemia, hypokalaemia; none of which were sere seen in our case.

Acute Immune Hemolytic Transfusion Reaction follows the major ABO mismatch Blood Transfusion. Here Antigen (Donor Red Blood Cells) and Antibody (Immunoglobulin G or M present in plasma of recipient) react causing rupture of red blood cell (hemolytic reactions) and intravascular clumping of RBC. The wide spread clumping and destruction of recipient's red blood cells, finally leads to the development of Disseminated Intravascular Coagulation (DIC) and other serious effects such as acute renal failure, cardiovascular collapse and death.

The clinical consequences of Hemolytic Transfusion Reaction (HTR) are triggered via several pathophysiological pathways.[5-8] After intravascular RBC destruction, hemoglobin is released into the plasma which remains bound with Haptoglobin, Hemopexin and Albumin. The hemoglobin is further broken down in the reticulo-endothelial system and absorbed by phagocytosis. If this absorption capacity is exceeded, free hemoglobin passes through the glomeruli and is reabsorbed by renal tubule. And when this reabsorption capacity is also exceeded, hemoglobin can be found in the urine (Hemoglobinurea).[9-10]

The hall mark of febrile non-hemolytic reactions is a mild to severe fever that may begin when the transfusion starts or within 2 hours after its completion.[11]

Confirming a hemolytic transfusion reaction requires proof of blood incompatibility and evidence of hemolysis. When such a reaction is suspected, the person's blood is retyped and cross matched with the donor's blood.[11]

After any sign of a hemolytic reaction, the transfusion is stopped immediately depending on the nature of the person's reaction. The health care team should report"transfusion incompatible blood" to the medical staff and ask them to help.

Protocol to be followed during a transfusion reaction:

- Stop transfusion and begin fluid infusion.
- Monitor vital signs every 15-30 minutes, watching out for signs of shock.
- Maintain an open intravenous line with normal saline solution.
- Insert an indwelling urinary catheter and monitor intake and output.
- Check for signs of DIC.
- Administer drugs such as intravenous medications to raise blood pressure and normal saline solution to combat shock. Adrenaline to treat shortness of breath and wheezing, corticosteroids to reduce inflammation. Furosemide to maintain urinary function. Parenteral antihistamine and corticosteroids are given for allergic reaction.

At the same time, the following examinations should be performed.

- Reexamine blood type of both patient pre-transfused blood sample and donor blood.
- Check for hemolysis, renal function and DIC.[11]

In this case, the patient's hemoglobin was low, so transfusion was needed. But we could not confirm the blood grouping with the first sample because the sample was hemolyzed. Therefore in this situation, we decided to transfuse the patient with "O" positive Packed Cell (washed) and "AB" Positive Plasma. So, neither "A" and "B" antigen nor any Anti "A" and Anti "B" antibody would enter the blood stream. And we got successful result after transfusion and hemodialysis. The patient's Hb% started to raise gradually, creatinine started to fall and the patient's blood samples became clear and normal (no evidence of hemolysis).

When the blood grouping was performed again (both forward and reverse), the result found was "O" Rh Positive. Therefore the patient was diagnosed as a case of "Mismatched Blood Transfusion".

Conclusion:

Transfusion errors are mainly due to transfusion of a wrong blood bag or transfusion to a wrong patient. Therefore to prevent ABO incompatible transfusion, identification of the patient and the blood bag are very important before transfusion as well as blood grouping by forward and reverse must be done for every patient to prevent errors. Cross matching by Indirect Coomb's test is also mandatory.

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