Case Report

Inadvertent Transfusion of Two Incompatible Blood Units: A Case Report

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Abstract

Background: An incompatible blood transfusion may lead to hemolytic transfusion reactions and severe complications such as intravascular hemolysis, multiorgan failure, and even death. Prevention, early diagnosis, and treatments have the main roles to decrease transfusion complications.

Cases Report: We present a case of a 43-year-old woman with a history of mandibular malignancy and facial reconstruction surgery who needed to blood transfusion due to a hemorrhage around her tracheostomy, and inadvertently 2 units of incompatible blood were transfused. The errors conduce to this issue and consideration to prevent and manage incompatible blood transfusions are discussed.

Conclusion: This case showed that an effective technique for recognizing and avoiding transfusion mistakes is staff awareness of the potential errors at the bedside and in the laboratory. Furthermore, patients' immunological status, early detection, and recognition of blood transfusion manifestation are critical factors for early diagnosis and treatment.

Keywords: Blood transfusion, ABO incompatibility, Coomb's test, hematuria, Hemolytic transfusion reaction

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Introduction

Although blood transfusion may be vital in some situations, it may cause fatality if incompatible blood is transfused. Incompatible blood transfusions may lead to dangerous complications such as hemolytic transfusion reactions, intravascular hemolysis, multiorgan failure, and even death[1,2]. The hemolytic reaction occurs due to the interaction of antibodies against ABO antigens of red blood cells[1,3].

In this article, we report a patient who despite receiving 2 units of incompatible blood, did not experience severe complications and was treated as soon as the issue was suspected. This case reports the main causes of transfusion errors, severity factors, and treatments.

Case Report

The case report obtained an ethics code of IR.SBMU.RETECH.REC.1399.1093 by informed consent regarding the presentation of the results and observing the principle of maintaining the confidentiality of information.

The patient was a 43-year-old woman with a history of mandibular malignancy for 8 years and prior surgeries of tumor resection and multiple facial reconstruction surgeries. Her body weight was 52 kg with a height of 162 cm. The patient presented with brief bleeding around the tracheostomy site and was admitted to the emergency department. In the initial evaluation, the hemodynamics was stable and she had a good general condition. A complete blood count (CBC) and blood type test were performed the CBC was in normal ranges and her blood type was Rh-positive. A blood reservation was done for possible intraoperative bleeding with the blood bank. During the physical examination, a sudden severe pulsative hemorrhage occurred. The bleeding site was packed, resuscitation with normal saline was started, 2 units of packed red blood cells (PRBC) for transfusion were ordered and the patient was transported directly to the operating room where the patient's medical documents were left in the ward and forgotten to transfer due to emergency. An unintentional B-type Rh-positive PRBC was begun for transfusion due to name similarities and a nursing error. After standard American Society of Anesthesiologists (ASA) monitoring, the patient was anesthetized with 100 micrograms of fentanyl, 100 milligrams (mg) of ketamine, and 20 mg of atracurium, and connected to an anesthesia machine from her tracheostomy. A low concentration of isoflurane was used for anesthesia maintenance. During surgical exploration, the cause of bleeding was found to be from the right external carotid artery due to previous iatrogenic anastomosis of an artery for flap during facial reconstruction. Due to the continuation of bleeding and hemorrhagic shock, after administration of 3 L normal saline and the first unit of PRBC, the second unit of PRBC was begun for transfusion after matching it with the prior blood unit as medical documents were still missed and the patient armband was not attached. As surgical hemostasis was done, despite stable hemodynamic status, the patient's urine bag started to become hematuria. The patient medical documents were requested and the patient's blood group was notified. A total volume of 480 milliliters (mL) of incompatible blood was transfused. Incompatible blood transfusion was reported to the blood bank and the patient blood sample for antibody analysis was obtained. Two liters of lactated Ringer solution, 3 L of normal saline, 100 milliequivalents of sodium bicarbonate, 100 g of mannitol, 40 mg of furosemide, and 100 mg of hydrocortisone were administered. The patient's urine volume continued to increase and vital signs were normal and stable.

Table 1: Results of laboratory tests.

	Arrival at ICU	**After 24h**	**After 48h**
WBC (/µL)	14000	11800	12600
Hb (g/dL)	6.6	5	6.8
Plt (/µL)	185000	143000	152000
PTT (s)	21	33	29
PT (s)	14	16.6	15
INR	1.29	1.30	1.15
Urea (mg/dL)	24	21	20
Cr (mg/dL)	0.7	1.7	1.6
Bili (mg/dL)	3.8	2.0	1.4
LDH (IU/L)	562	344	306

WBC. White Blood Cells, Hb. Hemoglobin, Plt. Platelet. PTT. Partial Thromboplastin Time, PT. Prothrombin Time, INR. International Normalized Ratio, BUN. Blood urea nitrogen, Cr. Creatinine, Bili. Bilirubin, LDH. Lactate Dehydrogenase.

Laboratory results revealed patient's blood reaction with B antibody has a weak titer (Coombs test +1). The patient was transferred to the intensive care unit (ICU) with supportive mechanical ventilation. Under standard ICU monitoring, vital signs were recorded as stable and normal. Fluid therapy was adjusted with urine volume to reach 1 mL/kg of body weight per hour and hematuria started to decrease. Petechiae lesions were evident in the patient's limbs and legs. Airways pressure and Lung function had remained normal. A hematology consultation was performed and 100 mg of intramuscular hydrocortisone was prescribed. Lab tests were performed at ICU admission and every next day (Table 1). One unit of crossmatched O-type Rh-negative PRBC was transfused on the second day of the ICU stay and then she was weaned from the ventilator. The patient stayed in the ICU for 3 days and was transferred to the surgical ward with stable vital signs and normal lab tests. She was discharged from the hospital 5 days later.

Discussion

Misidentification of the intended recipients and labeled blood just before transfusion, as well as, mislabeling of the recipient sample at collection are the most prevalent causes of transfusion mistakes[1,4–6], especially in emergencies as in our case, the error cascade started with patient misidentification.

Early detection of signs that might indicate a transfusion reaction necessitates timely notification to the blood bank and discontinuing of transfusion and starting treatment, however, no definite treatment exists[7]. The intensity of an acute hemolytic transfusion reaction (AHTR) is determined by the volume of administrated blood, immunoglobulin class, antigen-antibody reaction titer, and complement reaction[2]. However, some studies report that the transfused volume is not the major determinant of severity and lethality[1, 6]. In the presented case, despite 2 units of incompatible blood transfusion, a mild hemolytic reaction occurred may due to the slight antigen-antibody reaction.

Recognition of AHTR is more difficult under general anesthesia than in an awake person and symptoms may be limited to a decrease in blood pressure, disseminated intravascular coagulation which leads to uncontrolled bleeding from incision sites and mucosal membranes, or hemoglobinuria which presents with dark-colored urine[2]. As well as in our case that hematuria was the first presented symptom but the blood pressure never decreased, but also increased due to the previous hemorrhagic shock condition.

Laboratory tests such as a positive direct antiglobulin test (DAT; also known as direct Coombs test), hyperbilirubinemia, hemoglobinuria, elevated serum lactate dehydrogenase, and decrease haptoglobin confirm the diagnosis[8]. Our laboratory results also confirmed AHTR.

The prognosis for patients with heme-induced acute kidney injury (AKI) is generally favorable and most survivors will regain normal kidney function[2, 9]. The initial therapy is maintaining renal perfusion and urine production by administration of intravenous sodium chloride 0.9% and diuretics[5]. Diuresis and a decrease in BUN (blood urea nitrogen) are generally signs of impending recovery. In this case, despite transient elevated BUN and creatinine, only fluid therapy with 0.9% saline was used to maintain 50-100 mL/h urine output. If this initial therapy is not adequate, hemofiltration and plasma exchange therapy may be effective treatments[5,7].

Conclusion

Blood transfusion errors can be catastrophic. They can result in a lengthy hospital stay and substantial expenditures, as in this case who needed several days of ICU stay despite early recognition and low hemolytic reaction. This case showed that an effective technique for recognizing and avoiding transfusion mistakes is staff awareness of the potential errors at the bedside and in the laboratory. For this reason, requiring a second sample to confirm the ABO blood type might drastically reduce ABO-incompatible transfusions. As well as double-checking blood products with patient identification before transfusion with 2 medical staff, mentioning patients' name similarity alert labels in case of same names in the hospital administration, and using patient identification armbands in hospital administration may prevent transfusion errors. Furthermore, patients' immunological status, early detection, and recognition of blood transfusion manifestation are critical for early diagnosis and treatment.

Acknowledgments

None.

Conflict of interest

The authors further declare that they have no conflict of interest.

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