



Anaphylactic Reaction to Platelet Transfusion Post Cardiopulmonary Bypass in an Infant

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INTRODUCTION

The prevention and treatment of bleeding during cardiac surgery is a major perioperative concern, especially in pediatric patients. Thrombocytopenia and thrombocytopathy are common after cardiopulmonary bypass (CPB) due to both mechanical destruction of platelets and hemodilution. Although blood transfusion is generally safe, it is not without risks. These risks include allergic reactions, infection transmission, and volume overload.¹

CASE REPORT

A 5 month old (5.4 kg), A Positive female with a history of tetralogy of fallot (TOF) and severe pulmonary stenosis presented for TOF repair. After an uneventful separation from CPB, the platelet count was 47K. The patient received 20cc of donor directed type O Positive platelets prior to notification by blood bank that the patient required ABO identical platelets, given that she was <10 kgs (per institutional policy). Vitals and cardiac function were stable and unchanged, with no evidence of hemolysis. Due to continued hemostasis issues, 55 cc of ABO identical platelets was transfused. Significant hemodynamic instability with sustained hypotension was noted soon after. Severe bronchospasm, bilateral diffuse wheezing, and worsening lung compliance ensued, requiring boluses of epinephrine both intravenous and endotracheal. She also required an increase of her epinephrine drip, an addition of vasopressin drip, and multiple fluid boluses to maintain marginally acceptable hemodynamics. Given reassuring evidence of successful cardiac repair, anaphylactic versus anaphylactoid reaction to the ABO identical platelets was thought to be the etiology. The patient remained in labile critical condition for the next 24 hours in the ICU, requiring significant cardiopulmonary support, despite reassuring cardiac function. The patient remained thrombocytopenic post-operatively, with a nadir of 27K. This was treated conservatively with watchful waiting, given her previous severe reaction. Transfusion medicine was consulted. Since the reaction was likely donor-dependent, it was recommended that should she require additional platelets, it should be of her identical ABO group and from a different donor batch than the previous unit of platelets. She developed hypercarbic and hypoxic respiratory failure in the ICU, secondary to reperfusion injury vs TACO/TRALI, requiring lung protective strategy. With supportive management, the patient was discharged home on POD 9.

DISCUSSION

Pediatric cardiac surgeries are associated with a high rate of transfusions, due to patient and procedure-specific factors. The CPB machine requires significant priming volume, leading to hemodilution of coagulation factors and platelets.³ Platelet dysfunction also

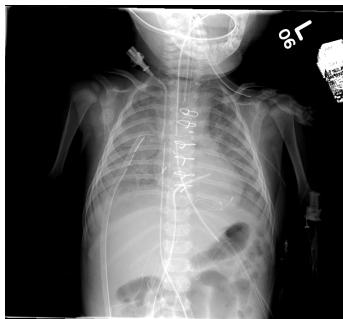


Figure 1. CXR immediately post-op, with diffuse lung opacities and pulmonary edema.

Patient's ABO group	ABO group of blood product to be transfused		
	Red cells	Platelets	FFP*
O			
First choice	O	O	O
Second choice	—	A	A or B or AB
A			
First choice	A	A	A or AB
Second choice	O†	O†	—
B			
First choice	B	B‡	B or AB
Second choice	O†	A or O†	—
AB			
First choice	AB	AB‡	AB
Second choice	A, B	A	A
Third choice	O†	—	—

*Group O fresh frozen plasma (FFP) should only be given to patients of group O. Although group AB FFP can be given to people of any ABO blood group, supplies are usually limited.

†Group O components which test negatively for 'high titre' anti-A and anti-B should be selected.

‡Platelet concentrates of group B or of group AB may not be available.

Figure 2. Choice ABO blood groups for blood products in infants and neonates.

occurs as a result of contact with the synthetic material of the bypass machine, as well as the hypothermia that occurs during bypass.⁵ Moreover, the patient's young age and small size (<10 kgs) can greatly compound issues of hemodilution, coagulopathy, and thrombocytopathy due to small blood volumes, immature coagulation system, and reduced platelet aggregation. For infants that are less than 10 kgs, it is imperative to keep in mind the importance of blood product management. Adult patients routinely receive ABO incompatible platelets without consequence. This is due to the dilution of donor anti-A or anti-B antibodies in the adult recipient's relatively large plasma volumes, which is not the case in small infants.⁴ For this reason, it is recommended that selection of blood components for infants should be of their own ABO and RhD group, or an alternative compatible ABO and RhD group (Figure 2). For platelet and FFP transfusions, products should be ABO identical to the recipient whenever possible, or ABO compatible. In this particular case, the first unit of platelets was not of their own ABO and RhD group. However, the anaphylactic reaction was to the second unit of platelets, which was ABO identical to the infant. This anaphylactic reaction was likely donor dependent, and due to an antibody to donor plasma proteins.

CONCLUSION

While the use of blood products is necessary and routine in pediatric cardiac surgeries, it is important to keep in mind the serious transfusion reactions that can occur. Life-threatening anaphylaxis is rare, but requires urgent detection and supportive care. It is also imperative to be mindful of the blood products, blood type, and volume of these products that we transfuse in an infant with lower plasma volumes.

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