

Introduction

- Allergic transfusion reactions (ATRs) are common adverse events, reported in 0.4 to 3% of all transfusions.¹
- Proteins and specifically platelet transfusions are most commonly implicated.²

TABLE 2. Comparison of adverse reaction rates by age group and component type, 2009 to 2015

Component type	Pediatric denominator*	Pediatric rate (per 100,000)	95% CI	Adult denominator*	Adult rate (per 100,000)	95% CI	p value
RBCs	132,846	577	537-619	558,206	278	264-292	<0.001
PLTs	67,737	833	766-905	147,192	358	328-390	<0.001
FFP	29,600	139	101-190	164,576	153	135-174	0.607
CRYO	30,074	3.33	0.174-21.6	90,438	6.63	2.70-15.2	0.999
Other†	407			1,793			
Total	260,664	538	510-567	962,205	252	242-262	<0.001

* n = number of units or doses transfused.

† Other includes WB, multiple component transfusions, granulocytes, unknown, and other/unspecified component types. CRYO = cryoprecipitate.

Vossoughi, et al. Transfusion. (2018)

- ATRs may add significant morbidity and mortality to the perioperative course.
- Avoidance of transfusion is not always an option during pediatric cardiac surgery on cardiopulmonary bypass due to hemodilution of the bypass circuit, platelet dysfunction, hypothermia, and underlying cardiac disease.³
- Therefore, a patient with a documented history of anaphylaxis to plasma proteins requires special management when presenting for cardiac surgery.
- We present the case of a 7 year-old female with a history of nephroblastoma and chemotherapy-induced cardiomyopathy who presented for left ventricular assist device (LVAD) placement, but had a documented anaphylactic reaction to plasma proteins.

Case Description

- A 7 year-old female with a history of nephroblastoma, treated with pre-surgical vincristine, right nephrectomy, and partial left nephrectomy.
- Two febrile, non-hemolytic reactions during transfusion of pRBCs during initial course of chemotherapy, due to anti-I antibodies (cold agglutinins).
- Post-surgery chemotherapy: vincristine, doxorubicin, cyclophosphamide, and etoposide.
- On subsequent admission for pancytopenia, had moderate ATR to transfusion of non-washed platelets.
- On following day, despite premedication with acetaminophen, diphenhydramine, and solumedrol, suffered severe ATR after additional transfusion of non-washed platelets, requiring resuscitation with IV fluids, epinephrine, and PICU admission.
- Diagnosed with major anaphylactic reaction to blood plasma proteins.
- Later presented to ED in acute heart failure due to chemotherapy-induced cardiomyopathy.
- After 5 weeks of inotrope therapy, experienced cardiac arrest requiring VA ECMO, scheduled for LVAD the following day.

Operative Course

- Day of surgery: pre-medicated with IV hydrocortisone.
- Intraoperatively: after initiation of CPB, platelet count decreased to $55 \times 10^9/L$.
- Prior to transfusion of washed and irradiated platelets, the patient was premedicated with IV acetaminophen and IV diphenhydramine.
- Hemostasis was achieved without further blood product transfusion

Discussion

- Multidisciplinary cooperation was necessary for management of transfusion needs during LVAD implantation
- Management considerations

Cold Agglutinins

- Warm blood products prior to transfusion
- Maintain patient normothermia

Plasma Protein Allergy

- Wash cellular transfusion products⁴
- Time considerations for our institution
 - One hour to wash pRBCs
 - Two hours to wash platelets
- FFP and cryoprecipitate are protein rich
- Avoid if possible

Coagulation Factor Replacement

- Factor Concentrates
 - Prothrombin Complex Concentrate
 - Fibrinogen Concentrate
- Administer Octaplas™⁵
- Solvent-detergent treated pooled plasma
- FFP after pre-medication
- Prophylactic vasopressor and inotrope
- Consider administering protein-rich products on cardiopulmonary bypass

References

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3. Romlin, B. S. et al. Platelet count and function in paediatric cardiac surgery: a prospective observational study. Br J Anaesth 113, 847–854 (2014).
4. Veeraputhiran, M. et al. A comparison of washed and volume-reduced platelets with respect to platelet activation, aggregation, and plasma protein removal. Transfusion 51, 1030–1036 (2011).
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