The role of the Serious Hazards of Transfusion Reporting Scheme in identifying changes in transfusion reaction patterns associated with new components.

NHS Blood and Transplant

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Introduction

All establishments in the UK who transfuse blood to patients are mandated to report transfusion reactions to the Serious Hazards of Transfusion (SHOT) reporting scheme. This scheme was initiated in 1996. In 2015 more than 2.5 million blood components were issued and 3965 reactions reported. SHOT therefore provides continued surveillance of blood transfusion practice and is well placed to identify any change in the incidence of reactions whatever the cause.

Type & Incidence of Acute Transfusion Reactions 2015

Allergic reactions are frequently reported. Out of 296 acute transfusion reactions (ATR) 122 were pure allergic and of these 58 were severe. See SHOT ATR table below and the International Haemovigilance Network/ International Society for Blood Transfusion (IHN/ISBT) ATR classification which is used by SHOT.

SHOT Acute Transfusion Reactions 2015

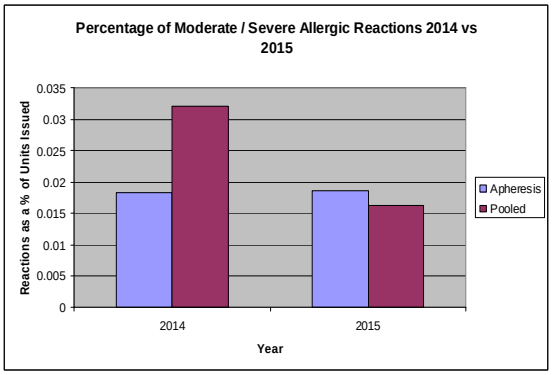
	Moderate	Severe	Total
Febrile	122	20	142
Allergic	64	58	122
Mixed allergic/febrile	18	7	25
Hypotensive	6	1	7

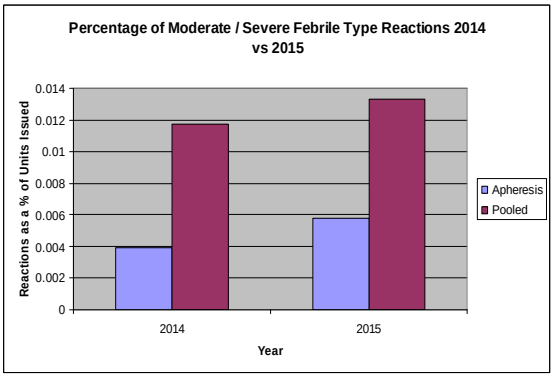
IHN/ISBT ATR classification

	1 = Mild	2 = Moderate	3 = Severe
Febrile type reaction	A temperature ≥ 38 °C and a rise between 1and 2°C from pretransfusion values, but no other symptoms/signs	A rise in temperature of 2°C or more, or fever 39 °C or over and/or rigors, chills, other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion	A rise in temperature of 2°C or more, and/or rigors, chills, or fever 39 °C or over, or other inflammatory symptoms/signs such as myalgia or nausea which precipitate stopping the transfusion, prompt medical review AND/OR directly results in, or prolongs hospital stay.
Allergic type reaction	Transient flushing, urticaria or rash	Wheeze or angioedema with or without flushing/urticaria/rash but without respiratory compromise or hypotension	Bronchospasm, stridor, angioedema or circulatory problems which require urgent medical intervention AND/OR, directly result in or prolong hospital stay, or **Anaphylaxis** (severe, life-threatening, generalised or systemic hypersensitivity reaction with rapidly developing airway and/or breathing and/or circulation problems, usually associated with skin and mucosal changes
Reaction with both allergic and febrile features	Features of mild febrile **and** mild allergic reactions	Features of both allergic and febrile reactions, at least one of which is in the moderate category.	Features of both allergic and febrile reactions, at least one of which is in the severe category.
Hypotensive reaction		Isolated fall in systolic blood pressure of 30 mm or more occurring during or within one hour of completing transfusion **and** a systolic blood pressure 80 mm. or less in the absence of allergic or anaphylactic symptoms. No/minor intervention required.	Hypotension, as previously defined, leading to shock (e.g., acidaemia, impairment of vital organ function) without allergic or inflammatory symptoms. Urgent medical intervention required.

Introduction of platelet additive solution to pooled platelets

In 2015 in England platelet additive solution (PAS) was used to replace plasma in concentrates made from platelet pools with full implementation by July 2015. Apheresis platelets remained suspended in plasma. Using adult data for England only and corrected for the total number of pooled and apheresis platelets issued, a reduction in the incidence of allergic reactions to pooled platelets of 50% (1:6122) compared to 2014 (1:3117) was identified. There was no significant difference in allergic reactions linked to apheresis platelets (1:5414 and 1:5494 respectively). Febrile type reactions associated with both types of platelet component increased in 2015 compared to 2014. In pooled platelets the increase was 14% (1:8571 and 1:7535 respecively) and in apheresis platelets the increase was 47% (1:25411 and 1:17325 respecively). The lack of a clear effect of PAS on febrile type reactions may be because these are caused by the accumulation of cytokines post storage and not directly related to plasma. Our results are in keeping with published studies (Tobian et al 2014, Cohn 2014, Cazenave et al 2011, Yanagisawa et al 2013).





Key Message

SHOT data and published studies indicate that the use of platelets suspended in platelet additive solution (PAS) are associated with a reduction in allergic response. Hospitals should consider preferential use of platelets suspended in PAS in patients with a history of this type of reaction. If reactions continue then platelets re-suspended in 100% PAS can be supplied.

References:
Tobian A.A.R, Fuller A.K, et al (2014) **The impact of platelet additive solution apheresis platelets on allergic transfusion reactions and corrected count increment**. *Transfusion*, **54,** 1523-1529.
Cohn C.S, Stubbs J, et al. (2014). **A comparison of adverse reaction rates for PAS C versus plasma platelet units.** *Transfusion*, **54,** 1927-1934
Cazenave J-P, Isola H, et al. (2011) **Use of additive solutions and pathogen inactivation treatment of platelet components in a regional blood center: impact on patient outcomes and component utilization during a 3-year period.** *Transfusion*, **51,** 622-629.
Yanagisawa R, Shimodaira S, et al (2013). **Replaced platelet concentrates containing a new additive solution, M-sol: safety and efficacy for pediatric patients.** *Transfusion*, **53,** 2953-2060.