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ORIGINAL ARTICLE

Platelet Lipidome Characteristics of Adverse Reactions Associated with Irradiated Aphaeresis Platelets Transfusion in Children

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SUMMARY

Background: **In clinical practice, we have observed that compared with red blood cells and plasma, platelet transfusion is more likely to cause transfusion adverse reactions, especially in children. Platelets may suffer different degrees of structural and biochemical damage during processing and preservation, and the lipid components contained in platelets may have a significant impact on the generation of transfusion adverse reactions. Therefore, the objective of this study is to identify the key bioactive lipid components that cause adverse blood transfusion reactions especially allergic rash and to explore ways to reduce the adverse transfusion reactions caused by irradiated aphaeresis platelets.**

Methods: **Platelet antibodies were determined in 15 children with rash after transfusion and 15 children with no adverse transfusion reactions, then lipid composition was analyzed by mass spectrometry. The Thermo UHPLC-Q Exactive HF-X Vanquish Horizon system compared differential lipid composition using GraphPad version 8.3.0 for statistical analysis and Pearson's correlation coefficient analysis.**

Results: **Platelet antibodies were negative in the allergic transfusion reaction (ATR) group. Among the platelet lipid components, PE (18:3/18:2) and TG (18:1/18:2/24:1) were up-regulated, whereas SM (d17:1/18:1), SM (d17:1/18:3) were significantly down-regulated in the no-AR group. Furthermore, the enrichment analysis of the KEGG pathway of differential lipids indicated that cholesterol metabolism has the most significant diversity.**

Conclusions: **The data suggests that the content of PE (18:3/18:2), TG (18:1/18:2/24:1), SM (d17:1/18:1), SM (d17:1/18:3) in platelets can prospectively predict transfusion-related allergic reactions in children. It is possible to improve platelet products by changing the lipid component of platelets to improve platelet transfusion efficiency.**
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Supplementary Data

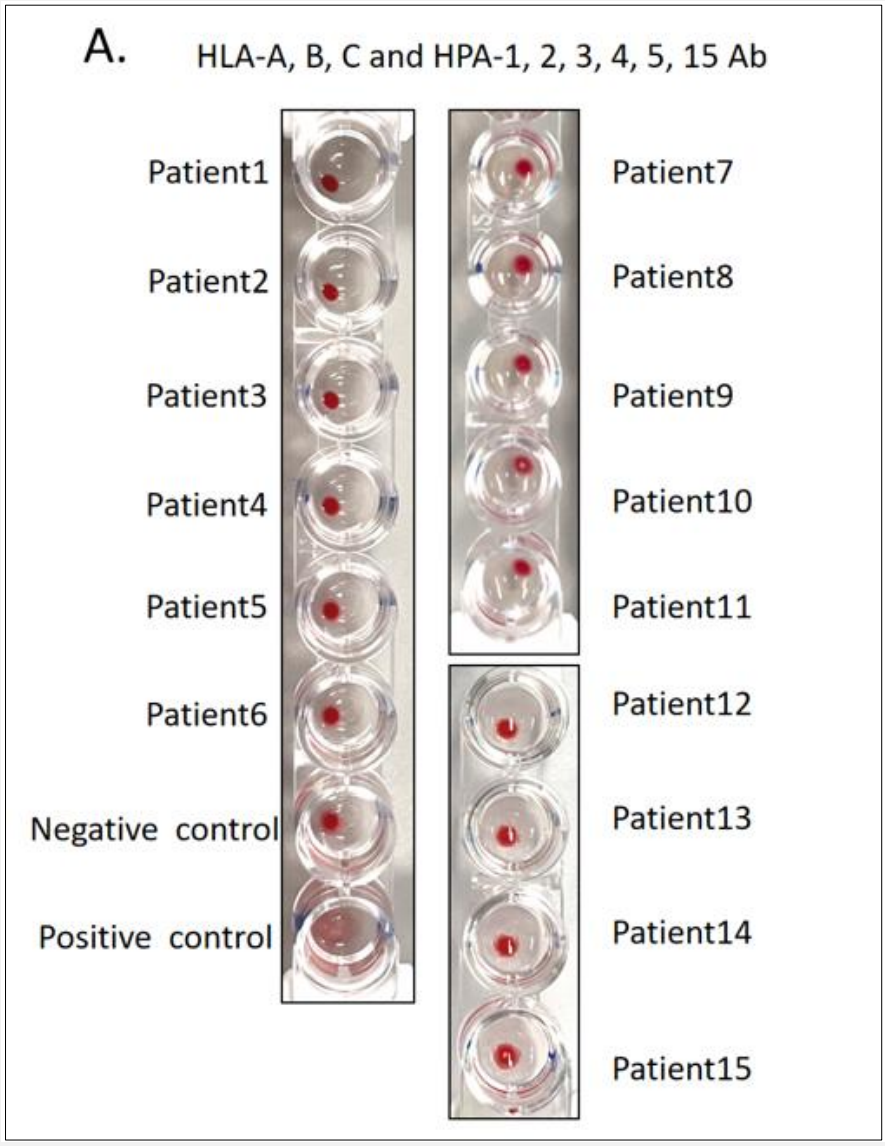

Figure S1. Detection of platelet antibodies in blood donors.

A Detection of anti-HLA and anti-HPA antibodies in 15 collected IAPs that caused allergic reactions as determined by MASPAT kit (Sanquin Regents, K1360). The experimental procedure is described in the Methods section of the text.