In vitro Platelet Activation in Platelet Concentrates after Leucocyte-Depletion by Filtration

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The transfusion of platelet concentrates is a common therapeutic strategy in patients undergoing cardiac surgery. The use of single-donor apheresis platelet concentrates and filtration of platelet concentrates are standard procedures to prevent initial or recurrent transfusion reactions like alloimmunization in thrombocytopenic patients. We determined the spontaneous and induced activation of platelets before and after leucocyte-depletion by filtration in 20 consecutive single-donor apheresis platelet concentrates. The filtration was done within two hours after production of platelet concentrates. Spontaneous, adenosine diphosphate-induced and collagen-induced CD62-expression were determined by flow cytometry via CD62-expression on platelet membrane surface. Furthermore, adenosine diphosphate- and collagen-induced aggregation were measured by aggregometry. Before filtration, 5.8% of platelets in single-donor apheresis platelet concentrates were activated spontaneously. Filtration led to a mild but significant increase (p<0.001) of spontaneous activation of platelets (8.4%). Measured cytometrically, filtration resulted in a significantly increased collagen-induced aggregability of platelets, whereas adenosine diphosphate-induction was unaffected. On aggregometer, adenosine diphosphate -induction resulted in a slightly but significantly decreased aggregation response after filtration (77% vs. 69%, p=0.03). We could not show differences in collagen-induced aggregation before and after filtration. In conclusion, due to our in vitro data we suggest that filtration has only a small impact on the clinically relevant functional integrity of single-donor apheresis platelet concentrates.


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