Activated Platelet Transfusions in Hematology-Oncology Patients are Associated with Lower Post-Transfusion Count Increments and Shorter Interval Between Transfusions

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Background/Case Studies: Prophylactic platelet transfusions could be life-saving for hematology-oncology patients. A post-transfusion platelet count increment (CI) of ≥ 20 x 10^9/L is usually expected. However, if this increment is not reached, additional transfusions may be warranted, which increases the demand of this limited resource and the associated risks of platelet refractoriness, infection and transfusion reactions. Platelet activation status has recently been shown to affect platelet transfusion efficacy. In this study we evaluated a method for routine screening of our platelet inventory and determined the effect of activated platelets on transfusion outcomes in our hematology-oncology patients.

Study Design/Method: A three-month, single arm, blinded pragmatic clinical study was conducted at Kansas University Medical Center (KUMC). Upon receipt from the regional blood donor center, each platelet unit (N = 2275) was tested for microparticle content (MP%) as indicator of platelet activation status (ThromboLUX, LightIntegra Technology Inc., Canada). On average, 25% of our apheresis platelet concentrates in inventory were labeled as activated platelets (MP% > 15%). Per protocol, transfusion-naïve hematology-oncology patients (de novo, N = 116) were to receive exclusively non-activated platelets. Due to ABO matching and other constraints, 37 patients received at least one unit of activated platelets (non-compliant) during the study period. Data were analyzed using a mixed effects model, 95% confidence interval and Wald-type intervals (Emmes Canada). Count increments are reported as means x 10^9/L.

Results/Finding: We found a statistically significant decrease in 18-hr post-transfusion platelet CI following an activated-platelet transfusion, with a mean of 22.88 (19.93, 25.82) before and 17.95 (14.20, 21.71, 22% reduction and p=0.002) at or after receipt of an activated-platelet transfusion. In addition, because the observed CI were below the expected and the treating physicians were blinded, days between transfusions decreased after receipt of an activated-platelet transfusion. The mean dropped by 32% (1.25 days, p=0.002) from 3.88 days (3.16, 4.77) before to 2.63 days (2.06, 3.37) after an activated-platelet transfusion.

Conclusion: Our study data support that activated platelets significantly affect the transfusion outcome of our hematology-oncology patients through reducing post-transfusion CI and intervals between transfusions. Therefore, preventing activated-platelet transfusions to hematology-oncology patients may help reduce the undue burden on both the patients and the blood bank.