

PLATELET MASS IS A BETTER INDICATOR OF PLATELET FUNCTION THAN PLATELET COUNT ALONE IN NEONATAL ECMO PATIENTS

Jenifer Cuestas¹, Shui R Hui², Joseph L Hagan³, Caraciolog J Fernandes³

¹ Baylor College of Medicine, Department of Pediatrics, Neonatology

² Texas Children's Hospital, Pathology, Transfusion Medicine

³ Baylor College of Medicine, Pediatrics, Neonatology

Background: Neonates treated with ECMO are at high risk for bleeding due to their immature hemostatic system and the use of systemic anticoagulation. Thus, while on ECMO, an infant's coagulation status is assessed frequently. As no test provides complete information, clinicians typically favor one or more tests, including platelet count (PC) and rotational thromboelastometry (ROTEM). While platelet count (PC) is routinely measured and transfusions given to maintain a given PC, platelet mass (PM), the total circulating volume of platelets, may be more important for platelet function and hemostasis than PC. While platelet function may be assessed using ROTEM, its relationship to PM has not been studied in neonates on ECMO. Objective: To determine the correlation between PM and platelet-specific maximal clot firmness (PMCF) using ROTEM to test the hypothesis that PM is a better surrogate for platelet function than PC alone.

Materials/Methods: Retrospective review of medical records of neonates with congenital heart disease treated with ECMO in the cardiovascular intensive care unit from 2015 to 2018. Data extracted included patient demographics, PC, mean platelet volume (MPV) and ROTEM data. Definitions were as follows: $PM = PC \times MPV$, $PMCF = EXTEM\ MCF - FIBTEM\ MCF$. Data were analyzed using mixed effects linear models to assess associations between variables while accommodating the correlation among repeated measurements from the same patients over time.

Results: A total of 94 tests on consecutive days were obtained for 13 ECMO patients. PM explains a significant proportion of the change in PMCF (38.6%, $p < 0.001$), while PC accounts for 26.1% of the change, ($p < 0.001$). MPV accounted for $< 1\%$ of the variation in change in PMCF ($p = 0.315$). In addition, each additional day of ECMO day was associated with a predicted 0.115 fL increase in MPV ($p = 0.010$).

Conclusions: PM is a better indicator of platelet function than PC alone and can be calculated from routine laboratory testing without the need for additional blood draws.