Evaluation of Platelet Aggregation Responses in Samples with Reduced Platelet Counts

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Platelet aggregation studies are essential to the diagnostic evaluation of platelet function disorders, including those associated with thrombocytopenia. A valid approach to evaluating aggregation responses for thrombocytopenic samples has not been established as reference intervals (RI) are typically determined using samples with normal platelet counts. We investigated if reference intervals (RI) for maximal platelet aggregation (%Aggr) for thrombocytopenic individuals could be derived from diluted healthy control samples.
Methods: Data on %Aggr were prospectively collected for 100 healthy volunteers (control samples diluted in platelet poor plasma to match concurrently tested patient samples) and 113 thrombocytopenic individuals, referred for testing by a hematologist. %Aggr was recorded for (final concentrations): 2 and 4 μM ADP, 1.25 and 5 μg/mL Horm collagen, 1.6 mM arachidonic acid, 1 μM thromboxane analogue, and 0.5 (LDR) and 1.25 (HDR) mg/mL ristocetin. Medical records were reviewed to obtain clinical diagnoses for patients, and additional results for individuals with thrombocytopenic disorders associated with abnormal aggregation (Bernard-Soulier syndrome [BSS] or type 2B von Willebrand disease [2B VWD]). Regression analysis was performed using the control sample responses to derive RI limits according to sample platelet counts.
Results: For healthy control samples, %Aggr with ADP, collagen, arachidonic acid, and thromboxane analogue was positively associated with sample platelet count. %Aggr with LDR, but not HDR, was influenced by sample platelet count. %Aggr responses were abnormal in 2/2 BSS and 2/2 2B VWD referred patients, as were previously tested individuals with these disorders (8/8).
Conclusions: Platelet aggregation responses with most agonists are dependent on the test sample platelet count. Using regression analysis, it was possible to describe RI for percentage aggregation responses according to platelet counts. Further evaluations are underway to assess the utility of these adjusted RI in interpreting aggregation findings for patients with thrombocytopenia due to diverse causes.