Testing Platelet Function in a Cardiopulmonary Bypass Patient Using a Near Patient Test System

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Introduction: During cardiopulmonary bypass (CPB) procedures, many patients are at risk of developing hemorrhagic complications with the subsequent requirement for transfusion due to excessive activation and/or the consumption of platelets. Therefore, it has been suggested that evaluating both platelet count and function may have clinical utility in the acute care setting of CPB surgery with point of care monitoring and timely results being important considerations.[1,2] The following case study describes a CPB patient who developed complications subsequent to the procedure, and a novel method for quantitating platelet count and function.

Clinical Course: McW is a 71 year old female who was referred for CPB at Baptist Hospital, Pensacola, FL in August 1998 for correction of 95% LAD lesion. Due to the small size of the LAD, mid CAB was recommended. The patient had a history of coronary artery disease, hypertension, transient ischemic attacks and was diagnosed with hypothyroidism and thrombocytosis. The patient had been on aspirin and Ticlid which was discontinued prior to surgery. During the mid CAB the patient was administered 20KU heparin. Due to ECG changes during the mid CAB, the patient was converted to routine sternotomy and bypass to perform the procedure.

Initial hemotocrit (Hct) was 39.1%, but due to hemodilution a unit of red blood cells (RBC) was transfused during bypass. Post-CPB the Hct was 17% and three units of cell saver blood were transfused, heparin was neutralized, 1000mL pump blood was given, and the ACT returned to baseline levels. It was shown that the Hct increased to 24.2% and a platelet count of $171x10^3/\mu L$ was recorded. Following transfer to the ICU the patient continued to bleed and developed severe hemorrhagic complications (chest tube drainage 200mL/hr). Multiple units of RBCs and fresh frozen plasma were transfused. A blood sample was taken to test platelet count and function on the ICHOR hematology triage system. Platelet function (aggregation) was determined in the presence of ADP, epinephrine and collagen and was shown to be 80, 20 and 30% respectively. Platelet function assessment using platelet rich plasma (PRP) in the hospital central laboratory was also performed. Here platelet aggregation was demonstrated at 75% with ADP, 22% with epinephrine and 36% with collagen. The results were available to the surgeon within 10 minutes from the ICHOR and 105 minutes from the central laboratory. Platelets were transfused, chest tube drainage slowed and stopped avoiding a return to the operating room.

Discussion: This case report demonstrates that the ICHOR system has potential for the near patient evaluation of platelet function (aggregation in response to an agonist) which in this case avoided a second procedure which would have resulted in re-opening the chest, additional hemorrhage, risk of infection, hypothermia, and additional cost and length of stay. Such testing may also permit the differentiation between surgical bleeding and platelet dysfunction. This test may have clinical utility and application in the triaging of patients undergoing CPB procedures.

References

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