Infusing Blood Products with the MedSystem III® Multi-Channel Infusion Pump

Eleanor L. Fitzgerald, RN, BSN
Senior Clinical Study Specialist

INTRODUCTION

Due to difficulties transfusing blood products by gravity with the consistency and timeliness desired by clinicians, the use of infusion pumps for this application has become increasingly popular. When rate and volume control are essential, an infusion pump becomes a useful tool to help ensure on-time and accurate blood delivery. This application has led, however, to concerns regarding potential hemolysis caused by the pumping mechanism of the infusion device. To address such concerns, a study was conducted demonstrating that the operation of the IVAC® MedSystem III® Multi-Channel infusion pump (formerly the MiniIVAC® Infusion System, Model MMT-9500) does not adversely affect the integrity of whole blood, packed red blood cells (pRBC) or platelets.

METHODS

Whole blood, pRBC’s and platelet concentrates were obtained from eighteen donors (n=18). A filtered blood sample was collected for each blood product (non-infused) to serve as a control. Whole blood and pRBC samples were infused at two rates (5mL/hr and 250mL/hr), with both fresh and outdated samples. These samples ranged from 2 to 3 days and 35 to 36 days in age respectively. Platelets were also infused at two rates (5mL/hr and 50mL/hr) ranging in age from 0 to 1 days and 7 to 8 days. Each experimental run was performed in a randomized fashion with a total of 12 experimental runs for each blood product. An 18 gauge, 1 1/2 inch needle and a 170 micron blood filter were used with all administrations. After the samples were collected (infused and non-infused), they were immediately centrifuged and the resultant supernatant was retained for analysis and comparison.

RESULTS

Red blood cell integrity was qualified by analysis of the plasma-free hemoglobin content in the supernatant. Platelet integrity was qualified by analysis of the lactate dehydrogenase (LDH) content in the supernatant. Increases above the control (non-infused) are directly proportional to the number of red blood cells and platelets lysed after infusion pump administration. Less than 0.01% of the red blood cells and platelets were lysed.

CONCLUSION

The MedSystem III® Multi-Channel infusion pump system did not adversely affect the integrity of whole blood, packed red blood cells, and platelets under the conditions of this study.

REFERENCES


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