Administration of blood products through the Alaris® Pump module

Alaris® System

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Forward
Delivering blood and blood products via an infusion pump is routinely done in the medical environment. The Alaris products team sponsored two studies to demonstrate that the Alaris Pump module is appropriate for this indication. Both of the studies concluded that the Alaris Pump module caused no clinically significant hemolysis while infusing packed red blood cells or platelets.

Study 1 methods
This study was performed in September 1999 using the Alaris Pump module and a reference device, the Gemini PC-2® infusion pump, to infuse both packed red blood cells (PRBCs) and platelets. The Gemini PC-2 infusion pump was released in 1986. There have been four studies done concluding that this pump is appropriate for blood product administration.1–4

Three units of PRBCs (AS-5), three days post expiration were obtained. Each unit had two IV administration sets attached to it, and they were primed by gravity. Six samples were obtained by gravity from each unit as the controls, or non-pumped samples. Three of the sets were loaded into the Alaris Pump module (one from each unit) and three were loaded into the Gemini PC-2 infusion pump (Note: Both pumps use the same disposable).

Three units of platelets (pheresis leukocytes reduced), 2–3 days post expiration, were obtained. Units 2 and 3 had two IV administration sets attached and were primed by gravity. Six samples were collected from each unit via gravity as controls. Two sets were loaded into the Alaris Pump module (one from each unit), and the other two were loaded into the Gemini PC-2 infusion pump. The pumps were run at 999 mL/hr until 50 mL were infused through each set. Then six more samples were collected from each unit and analyzed for plasma hemoglobin, total RBC count, hematocrit and mean corpuscular volume (MCV).

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Study 1 results
In the three units of PRBCs, there was no difference in the total RBC count, MCV and hematocrit among the controls and pumped samples. There were extremely high plasma hemoglobin levels seen in the control samples, and this was due to the outdated blood (since red blood
cells are labile and release hemoglobin as a function of storage time). The post-plasma hemoglobin levels from the Alaris Pump module were slightly higher than the Gemini PC-2 infusion pump in all three units. At the p=0.05 level, there was a statistical difference between the two pumping systems in one of the units only.

With the platelet infusions, there were no significant differences in the platelet counts between the two pumping systems for all three units tested.

**Study 2 methods**

This study was performed in December 1999 using the Alaris Pump module and again the Gemini PC-2 infusion pump as a reference instrument. Three units of PRBCs were obtained, 11–12 days before their expiration date. As in the previous study, two IV administration sets were attached to each unit, and they were primed by gravity. Six samples were obtained by gravity from each unit as the controls, or non-pumped samples. Three of the sets were loaded into the Alaris Pump module (one from each unit), and three were loaded into the Gemini PC-2 infusion pump. The pumps were run at 999 mL/hr until 50 mL were infused through each set. Then six more samples were collected from each unit and analyzed for plasma hemoglobin.

**Study 2 results**

The mean plasma hemoglobin levels from the Alaris Pump module were slightly higher than the Gemini PC-2 infusion pump in all three units of blood. However, statistical analysis of the Alaris Pump module vs. the Gemini PC-2 infusion pump samples showed that at the p=0.05 level, there were no significant differences between the two pumping systems with two of the three units of blood. With the third unit, while the mean from the Alaris Pump module samples was found to be statistically higher than that from the Gemini PC-2 infusion pump (p=0.0034), there was no statistical difference between the Alaris Pump module pumped and the non-pumped control sample.

**Conclusion**

In the statistically significant unit, there was approximately a 7–8% difference in the mean post-plasma hemoglobin levels between the Alaris Pump module and the Gemini PC-2 infusion pump. Although this was statistically significant, this is not clinically significant because the percentage of hemolysis in the total number of red blood cells would be minimal. There was not a statistically significant difference in mean post-plasma hemoglobin levels for the other two units of PRBCs.

We conclude that the Alaris Pump module is clinically acceptable for the infusion of PRBCs and platelets.

For more information, visit carefusion.com/alaris.

References


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