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ABSTRACT

Have We Missed Something? Whole Blood Conservation and Management in Cardiac Surgery: Costs, Ethics and Best Practices Samolyk, Keith¹; Beckmann, Scott² 1. [Global Blood Resources LLC](#), Somers, CT US; 2. Salem Hospital, Cardiac Surgery, Salem, OR

Introduction: There is an international crisis in the healthcare system with regard to the allogeneic blood supply, its use, and associated costs. The concern is arguably one of greatest in the cardiac surgery arena. Professional organizations related to cardiac surgery charge their member surgeons, physicians, perfusionists, and nurses with codes of ethics that appear to be infrequently followed when it comes to blood administration practices. Increased patient morbidity and mortality associated with allogeneic blood use are well-documented in cardiac surgery. There are vast differences in transfusion practices between cardiac surgical facilities throughout the world. As well, there are numerous blood conservation maneuvers (e.g. ANH, RAP, Off-Line MUF) that could be employed during cardiac surgery that have not been widely adopted as standard of care. Patient data from the underutilized ultrafiltration technique of processing residual extracorporeal circuit blood is presented as an example of a best practice and a means to reduce allogeneic blood related costs.

Procedure: Hematocrit, platelet count, fibrinogen concentration (FIB), PT, PTT and INR were compared between ten Hemobag[®] (HB) adult cardiac surgical patients and ten non- HB patients at two times after CPB: 1) post acute normovolemic hemodilution (ANH) infusion and protamine administration, and 2) after admission to ICU, approximately one hour after CPB and HB content infusion. Minimal cell processing was also employed in the HB patients to conserve blood. Cell washing was employed in the non-HB group to process the residual circuit blood.

Results: Except for PTT, all parameters changed significantly from the post-protamine and ANH infusion, to approximately one hour after HB blood infusion and arrival in the ICU. FIB ($p = 0.048$) and the hematocrit ($p = 0.046$) were significantly higher in the HB group compared to the non- HB group at the end of the golden hour, despite infusion of significantly more allogeneic blood products ($p = 0.070$) and more washed RBCs ($p = 0.001$) in the non-HB group. All but one of the HB patients did not receive any allogeneic blood products during the critical golden hours window and balance of their hospital stay.

Conclusions: Most allogeneic blood products are transfused in the golden hours and often based upon arbitrary clinical observations without adequate documentation for the real need for the blood bank components. The results of this case series strongly suggest that cardiac surgery patients may be spared donor exposures when the residual bypass circuit blood is concentrated compared to cell washed. Use of the Hemobag[®] technique for salvaging blood is associated with significant increases in the patients protein and cellular concentrations and lowered coagulation times in the important, first few golden hours following CPB. Use of ultrafiltration to process residual perfusion circuit blood will go far to bring health professionals into compliance with professional codes of ethics. This will further provide patients with the best quality care they expect and deserve through the reduction of the use of excessive and unnecessary allogeneic blood products which are directly related to costly, negative, patient outcomes and in most cases may be avoided.

Samolyk K, Beckman S. Have we missed something? Whole blood conservation and management in cardiac surgery: costs, ethics and best practices. *Transfusion* 2007;47(2):3A.