Warm fresh whole blood transfusion for severe hemorrhage: U.S. military and potential civilian applications

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Abstract

Objective: The objective of this study was to review the history and current literature regarding the benefits and risks of warm fresh whole blood transfusion to include recent U.S. Army research from Afghanistan and Iraq. We also discuss current indications for its use as well as potential civilian applications for large-scale disasters.

Background: The use of warm fresh whole blood currently only persists in emergency life-threatening scenarios when tested stored blood components are not available. Recent combat operations in Afghanistan and Iraq have redirected attention on the benefits and risks of warm fresh whole blood for life-threatening injuries in casualties.

Main results: Between March 2003 and July 2007, over 6000 units of warm fresh whole blood have been transfused in Afghanistan and Iraq by U.S. medical providers to patients with life-threatening traumatic injuries with hemorrhage. Preliminary results in approximately 500 patients with massive transfusion indicate that the amount of fresh warm whole blood transfused is independently associated with improved 48-hr and 30-day survival and the amount of stored red blood cells is independently associated with decreased 48-hr and 30-day survival for patients with traumatic injuries that require massive transfusion. Risks of warm fresh whole blood transfusion include the transmission of infectious agents and the potential for microchimerism.

Conclusions: For patients with life-threatening hemorrhage at risk for massive transfusion, if complete component therapy is not available or not adequately correcting coagulopathy, the risk:benefit ratio of warm fresh whole blood transfusion favors its use. In addition, recent evidence suggests that there is potential for warm fresh whole blood to be more efficacious than stored component therapy that includes stored red blood cells in critically ill patients requiring massive transfusion. Efforts must continue to improve the safety of warm fresh whole blood transfusion for patients when it is required in emergency situations. U.S. civilian disaster agencies are preparing guidelines for its use in massive casualty scenarios and prospective, randomized trials are about to start to determine whether stored warm fresh (<24 hrs) whole blood improves outcomes compared with standard stored component therapy.

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