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Optimal trauma resuscitation with plasma as the primary resuscitative fluid: the surgeon's perspective.

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Abstract:

Over the past century, blood banking and transfusion practices have moved from whole blood therapy to components. In trauma patients, the shift to component therapy was achieved without clinically validating which patients needed which blood products. Over the past 4 decades, this lack of clinical validation has led to uncertainty on how to optimally use blood products and has likely resulted in both overuse and underuse in injured patients. However, recent data from both US military operations and civilian trauma centers have shown a survival advantage with a balanced transfusion ratio of RBCs, plasma, and platelets. This has been extended to include the prehospital arena, where thawed plasma, RBCs, and antifibrinolytics are becoming more widely used. The Texas Trauma Institute in Houston has followed this progression by putting RBCs and thawed plasma in the emergency department and liquid plasma and RBCs on helicopters, transfusing platelets earlier, and using thromboelastogram-guided approaches. These changes have not only resulted in improved outcomes, but have also decreased inflammatory complications, operations, and overall use of blood products. In addition, studies have shown that resuscitating with plasma (instead of crystalloid) repairs the "endotheliopathy of trauma," or the systemic endothelial injury and dysfunction that lead to coagulation disturbances and inflammation. Data from the Trauma Outcomes Group, the Prospective Observational Multicenter Major Trauma Transfusion (PROMTT) study, and the ongoing Pragmatic Randomized Optimal Platelet and Plasma Ratios (PROPPR) trial represent a decade-long effort to programmatically determine optimal resuscitation practices, balancing risk versus benefits. With injury as the leading cause of death in patients age 1 to 44 years and hemorrhage the leading cause of potentially preventable death in this group, high-quality data must be obtained to provide superior care to the civilian and combat injured.