The effects of prehospital plasma on patients with injury: a prehospital plasma resuscitation.

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BACKGROUND: The prehospital resuscitation of the exsanguinating patient with trauma is time and resource dependent. Rural trauma care magnifies these factors because transportation time to definitive care is increased. To address the early resuscitation needs and trauma-induced coagulopathy in the exsanguinating patient with trauma an aeromedical prehospital thawed plasma-first transfusion protocol was used.

METHODS: Retrospective review of trauma and flight registries between February 1, 2009, and May 31, 2011, was performed. The study population included all patients with traumatic injury transported by rotary wing aircraft who met criteria for massive transfusion protocol.

RESULTS: A total of 59 patients identified over 28 months met criteria for initiation of aeromedical initiation of prehospital blood product resuscitation. Nine patients received thawed plasma-first protocol compared with 50 controls. The prehospital plasma group was more commonly on warfarin (22 vs. 2%, p = 0.036) and had a greater degree of coagulopathy measured by international normalized ratio at baseline (2.6 vs. 1.5, p = 0.004) and trauma center arrival (1.6 vs. 1.3, p < 0.001). The prehospital plasma group had a predicted mortality nearly three times greater than controls based on Trauma and Injury Severity Score (0.24 vs. 0.66, p = 0.005). The use of prehospital plasma resuscitation led to a plasma-red blood cell ratio that more closely approximated a 1:1 resuscitation en route (1.3:1.0 vs. not applicable, p < 0.001), at 30 minutes (1.3:1.0 vs. 0.14:1.0, p < 0.001), at 6 hours (0.95:1.0 vs. 0.42:1.0, p < 0.001), and at 24 hours (1.0:1.0 vs. 0.45:1.0, p < 0.001). An equivalent amount of packed red blood cells were transfused between the groups. Despite more significant hypotension, less crystalloid was used in the prehospital thawed plasma group, through 24 hours after injury (6.3 vs. 16.4 L, p = 0.001).

CONCLUSION: Use of plasma-first resuscitation in the helicopter system creates a field ready, mobile blood bank, allowing early resuscitation of the patient demonstrating need for massive transfusion. There was early treatment of trauma-induced coagulopathy. Although there was not a survival benefit demonstrated, there was resultant damage control resuscitation extending to 24 hours in the plasma-first cohort.