PRE-HOSPITAL BLOOD AND PLASMA USE IN PEDIATRIC TRAUMA PATIENTS

INTRODUCTION: Contemporary treatment of coagulopathy from trauma focuses on early transfusion of packed red blood cells (PRBC) and plasma in a 1:1 ratio. Damage control resuscitation for pediatric trauma patients is rare with limited research on blood administration in the pre-hospital environment. Our rural trauma center has instituted a program utilizing PRBC and plasma onboard our helicopter service to offset the delay of blood transfusion due to prolonged transport of patients. Logistics of setting up such a program will be reviewed as well as data from those pediatric patients who received blood products during helicopter transport.

METHODS: We performed a retrospective chart review including all transports of pediatric trauma patients (≤ 18 years) who received blood products during helicopter flights from January 1, 2003 through December 2012. Fresh O- PRBC’s have been carried since 1987 and thawed A+ plasma since 2009. To ensure complete follow-up, only patients transported to our level 1 adult and pediatric trauma center were included.

RESULTS: Sixteen patients (6 females) were identified with a mean age of 13 years (range 5-18). Seventy-five percent of transports were from a referring hospital with an average transport time of 30 minutes (range 5-41). Mechanism of injury was blunt in 9 patients (MVA, auto vs ped, bull attack, and fall) and penetrating in 2 (GSW). Mean ISS was 33 (9 – 66). Indication for PRBC transfusion was: severe anemia in 6, known significant blood loss in 5, and transient or non-responder to IVF in 4. Ten patients received 1 unit PRBC with 2 patients receiving 2 and 3 units respectively. Five of these patients were receiving blood prior to helicopter transport. One patient received plasma without PRBC transfusion. Five patients received plasma with PRBC transfusion per established protocol. An average of 1.4 units of plasma was given. The average hemoglobin improved during transport from 9.4 mg/dl at the referring center to 10.1 mg/dl during transport and 11.4 mg/dl at our center. Similarly, base deficit trended to normal with mean deficit at outside institution of -7 versus -5.7 at our center. Mean arrival INR was 1.9. Fourteen patients received additional PRBC at our hospital and 8 patients received plasma guided by thromboelastography results. Five patients underwent immediate intervention for hemorrhage control: 1 laparotomy, 1 neck exploration, 2 IR embolizations, and 1 craniectomy. One patient underwent a delayed splenectomy on day 2. The average LOS was 9.3 days. Four patients died with 75% of patients surviving to discharge. TRISS analysis showed that all 4 deaths were expected and 3 patients were unexpected survivors (ISS 41, 50, 50).

CONCLUSION: Pre-hospital use of PRBC and plasma in injured children is rare onboard a helicopter. However when indicated, administering PRBC and plasma showed an increase in arrival hemoglobin, a decrease in acidosis, and resulted in unexpected survivors at our Level I pediatric trauma center. Indications for administration of blood products in this severely injured population required continued review and refinement.