Hextend and 7.5% Hypertonic Saline with Dextran are Equivalent to Lactated Ringer’s in a Swine Model of Initial Resuscitation of Uncontrolled Hemorrhagic Shock

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Abstract

Background: The ideal fluid for initial resuscitation in trauma has not been fully elucidated. The objective of the current study was to determine the efficacy of an initial bolus of resuscitative fluids currently utilized in military and civilian settings on the physiologic response to uncontrolled hemorrhagic shock. Design: Prospective, randomized, blinded, animal study in a Level 1 Trauma Center animal laboratory involving fifty Yorkshire-crossbred female swine. Methods: Anesthetized swine underwent central venous and arterial catheterization followed by celiotomy. A grade V liver injury was performed, followed by 30 minutes (30’) of uncontrolled hemorrhagic shock. After 30’, liver packing was completed and randomized blinded fluid resuscitation was initiated over a 12’ period with two liters of normal saline (NS), two liters of Lactated Ringer’s (LR), 250 ml of 7.5% saline with 3% Dextran (HTS), 500 ml of Hextend (HEX), or no fluid (NF). Animals were monitored for 2 hours post injury. Total blood loss after initial hemorrhage, continuous mean arterial pressure (MAP) and tissue oxygen saturation (StO2), and hematocrit, pH, base excess, and lactate at baseline, 1 HR, and 2 HR were measured. Results: The NF group had less post-treatment blood loss compared to the fluid groups. MAP and StO2 for HEX, HTS, and LR at 1 HR and 2 HR were comparable and superior to NF. NS was not statistically different from NF for MAP and StO2 but did result in lower pH and decreased base excess. Conclusions: Withholding resuscitative fluid results in the least amount of post-treatment blood loss. In the clinically utilized bolus volumes given, HEX and HTS are equivalent to LR with .