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SUPERIOR EFFICACY OF A NOVEL PLASMA SUBSTITUTE, AQIXRS-I, COMPARED TO PHYSIOLOGICAL SALINE IN A RODENT MODEL OF HEMORRHAGE

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Background. Resuscitation can exacerbate cellular injury caused by hemorrhagic shock and the choice of fluid used for resuscitation may play an important role in this injury. Traditional resuscitation has involved administration of large volumes of isotonic crystalloid or colloid solutions followed by blood products as necessary. Experimental studies have demonstrated that the use of these fluids has been associated with neutrophil activation and tissue reperfusion injury. Aims. This study was conducted to determine if a novel non-phosphate buffered physiological solution, designed and developed for the preservation of human organs for transplantation, can be used successfully to minimize tissue reperfusion injury and improve survival. Methods. The Institutional Animal Care and Use Committee approved this study. The study adhered to the principles stated in the Guide for the Care and Use of Laboratory Animals, National Research Council, 1996 edition, as approved by the Institutional Animal Care and Use Committee. Nineteen Sprague-Dawley rats were anesthetized and had their abdominal aorta cannulated using a 24 gauge angiocatheter. The rats were subjected to serial withdrawal of blood in 2cc increments (simulating controlled hemorrhage) every 30 minutes. The rats were randomly allocated to one of 3 arms: Replacement of blood volume with an equal volume of physiologic saline, replacement of blood volume with an equal volume of AQIX®RS-I (Res-Del International Ltd., London, UK) or no replacement of blood losses. The primary end point of the study was the death of the animal documented by cardio-respiratory arrest. Results. Rats in the no-resuscitation arm had the shortest survival and least blood volume withdrawn. Survival time and mean volume withdrawn were significantly improved by the addition of either normal saline or AQIX®RS-I resuscitation. AQIX®RS-I provided a statistically superior survival time ($p < 0.01$) (Figure 1) and allowed larger volume of blood withdrawn compared to physiological saline ($p < 0.01$). The mean difference in survival times between the AQIX®RS-I resuscitated rats and saline resuscitated rats was significant at 43.40 ± 6.90 minutes ($p < 0.01$). Conclusions. AQIX®RS-I appears to be a more effective plasma substitute than physiological saline with respect to survival time and volume blood loss in a rat model of controlled hemorrhagic shock. This study will serve as the basis for further detailed investigation of the potential benefits of AQIX RS-I use as a resuscitation solution in hemorrhagic shock.

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