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Animal Study Shows Significant Preclinical Outcomes[1]

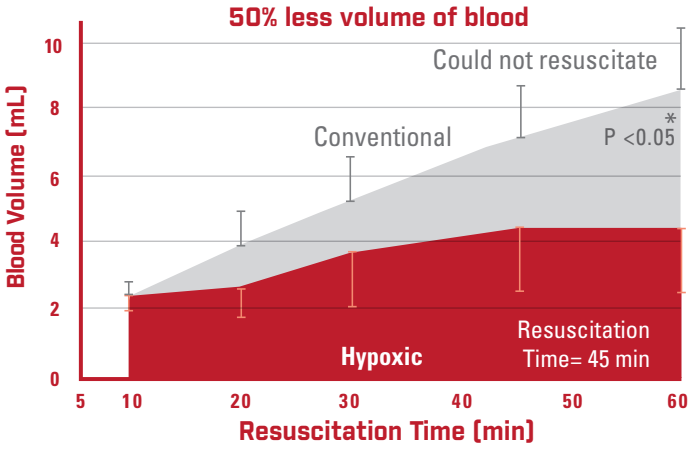
First of its kind in vivo study to assess the functionality of anaerobically stored RBCs

In a recent hemorrhagic shock (HS) animal study, resuscitation from HS via transfusion of hypoxically stored red blood cells (RBCs) recovered cardiac function, restored hemodynamic stability, and improved outcomes.

Study Results: Physiological Results

Methods: Rat RBCs were stored under anaerobic, anaerobic/hypercapnic, or conventional conditions for a period of 3 weeks. Hemorrhage was induced by controlled bleeding, shock was maintained for 30 min, and RBCs were transfused to restore and maintain blood pressure near the pre-hemorrhage level. 24-h post transfusion recovery of stored RBCs was used as the parameter to determine the age of the rat RBCs transfused.

- Reduced Transfusion Volume
- Reduced Intravascular Hemolysis
- Reduced Lactate
- Reduced Markers of Organ Injury



Hypoxically stored blood dramatically improved resuscitation efficacy by reducing the volume transfused and time to restore MAP.

Hypoxic RBC Conventional RBC * Includes ± standard deviation

Reduced Transfusion Volume

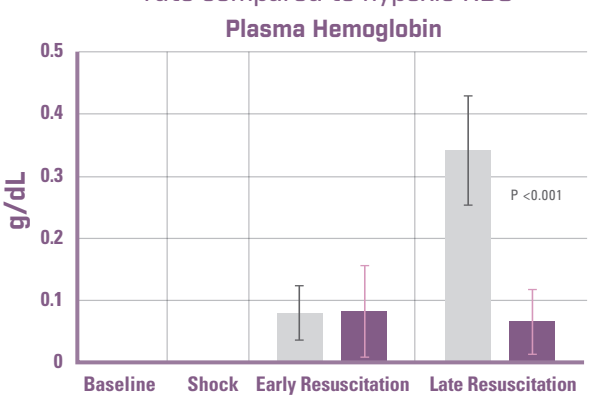
A primary outcome of the study was to compare the transfusion volume required to resuscitate the animals to 90% of baseline mean arterial blood pressure (MAP).

Hypoxically stored blood was not only more effective at restoring MAP, it achieved resuscitation with only half the volume of transfused blood in a shorter amount of time.

Reduced Intravascular Hemolysis

If the integrity of the RBCs are not maintained after transfusion, they are unable to deliver oxygen; the hypoxic RBCs were significantly more stable than conventionally stored RBCs.

Conventionally stored RBC hemolyzed in circulation after transfusion at much higher rate compared to hypoxic RBC



†Data not shown Hypoxic RBC Conventional RBC * Includes ± standard deviation

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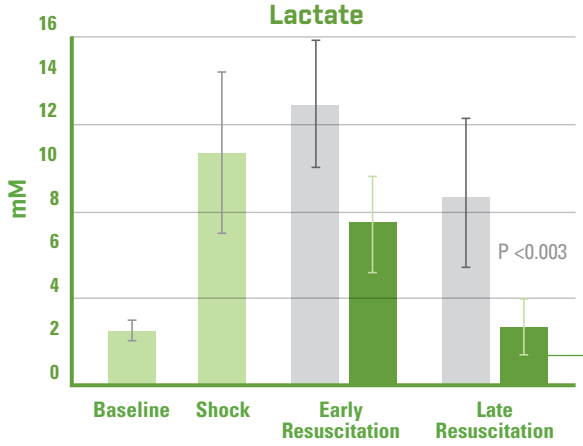


10 to 15 minutes into resuscitation, the lactate levels for the conventional control continued to climb, while the lactate in hypoxically stored blood was decreasing.

Hypoxic RBC Conventional RBC * Includes ± standard deviation

Reduced Lactate

Lactate is an important biomarker for the severity of hemorrhagic shock as well as survival.[2]

Hypoxically stored RBCs rapidly reduced lactate levels and restored levels to near normal in late resuscitation.

A key point is that the observed lactate reductions in animals were achieved by delivering half the volume compared to conventionally stored blood.

After 60 minutes of resuscitation hypoxically stored blood restored lactate levels to near baseline.

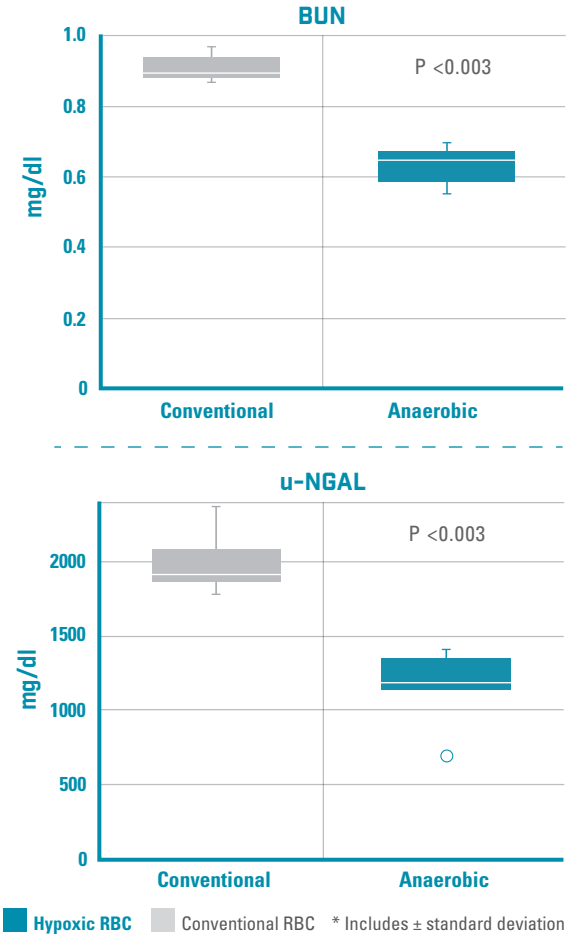
Reduced Markers of Organ Injury

Acute Kidney injury (AKI) is a well known consequence of hemorrhagic shock and is associated with receiving blood transfusions.[3] Two key indicators of kidney damage are blood urea nitrogen (BUN) and urine neutrophil gelatinase-associated lipcalin (u-NGAL).

The levels of both biomarkers were significantly reduced following transfusion with hypoxically stored blood indicating the potential to reduce AKI in patients with hemorrhagic shock.

In addition, in the lungs, liver, and spleen, hypoxically stored blood reduced the extent of organ hypoxia, preserved organ function, and prevented vital organ injury relative to conventionally stored RBCs.

Clinical markers indicate reduced kidney damage with hypoxically stored blood



Hypoxic RBC Conventional RBC * Includes ± standard deviation

1. Williams et al. Transfusion of anaerobically or conventionally stored blood after hemorrhagic shock. SHOCK Mar. 2020.
2. Odom et al. Lactate clearance as a predictor of mortality in trauma patients. Journal of Trauma and Acute Care Surgery Apr. 2013.
3. Rasmussen et al. Association between transfusion of blood products and acute kidney injury following cardiac surgery. Acta Anaesthesiol Scand Jul. 2020.

Hemanext is a privately held medical technology company dedicated to improving the quality, safety, efficacy, and cost of transfusion therapy. Our research and development efforts center on hypoxically stored red blood cells (RBCs).

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