Key Points:

- Preclinical studies in canine trauma models suggest that whole blood is the fluid of choice in volume resuscitation of trauma patients.
- Damage control resuscitation involves use of blood products for volume resuscitation and correction of coagulopathy in severely traumatized patients.
- Proper donor screening, processing and storage of blood produce is imperative to ensure patient safety.
- Clinicians should be aware of types of transfusion reactions and methods for preventing and/or managing them.

Traumatic shock, defined as decreased delivery of oxygen (DO₂) to the tissues secondary to traumatic injury, results from a combination of decreased oxygen carrying capacity (CaO₂) secondary to loss of red blood cell mass and decreased cardiac output secondary to decreased stroke volume and pre-load. Volume resuscitation with crystalloid or colloid fluid will increase intravascular volume and pre-load, but does not address loss of oxygen carrying capacity.

Severely injured trauma patients may develop coagulopathy as a result of blood loss, consumption and dilution from volume resuscitation. Additionally, damage to the endothelium results in release of tissue factor leading to initiation of the inflammatory and coagulation cascades.

Damage control resuscitation (DCR) has been described in the pre-clinical and human-clinical trauma literature (much of which has come from military experiences). The goal of DCR is to focus on interventions to improve physiologic status and minimize initial surgical interventions to only those necessary to control hemorrhage and contamination on severely injured patients. The key concepts of DCR include permissive hypotension, use of blood products for volume resuscitation and early correction of coagulopathy.

There are eight common blood types in dogs. DEA 1.1 and 1.2 are the two major antigens in dogs. Dogs are either negative for both or positive for either (not positive for both). DEA 1.1, 1.2 and 7 negative dogs are considered universal donors. Pregnancy can induce DEA 1.1 alloantibodies in up to 25% of dogs. Acute hemolytic transfusion reactions are very rare in dogs due to clinically insignificant amounts of alloantibodies, and therefore, first time transfusion in dogs that have not been pregnant tend to be safe. Dogs that are DEA 1.1 and 1.2 negative, and are subsequently exposed to 1.1 or 1.2 positive blood, will develop antibodies 4-14 days post exposure, therefore, previously transfused dogs, and those that have been through a pregnancy should be cross-matched with donor blood prior to transfusion.

Described transfusion reactions in human and pre-clinical research (that have not been confirmed in veterinary medicine), include transfusion-related acute lung injury (TRALI), transfusion associated circulatory overload (TACO) and transfusion immodulation. Reperfusion injury is also a risk associated with transfusion.


