Plasma Expanders in Practice

Plasma expanders are high molecular weight colloidal solutions that remain in the vascular space. When used in the treatment of hypovolaemia they can produce a significant increase in blood volume, cardiac output, stroke volume, blood pressure, urinary output and oxygen delivery, increasing volume and pressure. They are normally used in situations of haemorrhage, acute shock, burns or serious sepsis.

Colloids should always be given intravenously. In an emergency give as a slow bolus, but administer over one to several hours to treat oedematous animals. A 24-hour constant-rate infusion of colloids, in conjunction with a low flow rate of crystalloids is recommended for treatment of the hypoalbuminaemic patient. In cases of severe haemorrhage colloids can be administered simultaneously with a blood transfusion.

Pentaspan contains 10% Pentastarch (a sub-group of hydroxyethyl starch) in a 0.9% Nacl solution. The recommended dose for dogs is 20mls/kg/day, and for cats is 10mls/kg. Usually it is given in conjunction with crystalloids. Rapid expansion can be detrimental and caution is needed in animals with oliguric or aneuric renal failure, or congestive heart failure. All colloids can affect coagulation factors, especially Factor VIII and von Willebrand’s factor. Clinical bleeding is rare but coagulopathy is an absolute contraindication. Gelofusine doesn’t interfere with platelet function so may be preferred over Pentastarch in cases of, or at risk of haemorrhage.

The volume and rate of infusion of Gelofusine, which is bovine gelatine based, is dependent on need, with the dose essentially equivalent to the volume loss. In severe blood loss give 1% of bodyweight over 5-10 minutes to alleviate signs of hypovolaemia. You can give blood at the same time. For other emergency expansion give 3-5mls/kg over fifteen minutes. Continued slow administration can be given to a total dose of 10-20mls/kg/24 hours. Given as a bolus the effect of Gelofusine lasts about four hours, making it ideal for short term hypovolaemic or hypotensive shock. It will help to reverse anuria due to shock in dogs, but needs to be used with caution in cases of renal failure due to other causes. The Urine SG and protein will increase due to renal excretion of the gelatin protein.

Mild urticarial reactions have been reported to all plasma expanders, and in humans severe anaphylaxis is seen, albeit rarely. Animals with any known existing allergic conditions such as drug reactions or asthma, need to be monitored carefully. Excessive volumes can lead to circulatory overload and electrolyte imbalance, so monitoring is important. If necessary, stop the infusion and give diuretics. Colloids should not be used to prevent falls in arterial pressure due to spinal anaesthesia.