When to use human albumin solution

Albumin is the main factor determining the oncotic pressure of blood and regulates plasma volume and tissue fluid balance. It is responsible for 60-80% of the osmotic pressure of plasma. Other functions include binding and transport within plasma, antioxidant free radical scavenging and anticoagulation.

Defining hypoalbuminaemia in preterm newborns is difficult as they frequently have lower albumin concentrations when compared with term infants. Cartlidge and Rutter's study of 195 newborns of 25 – 42 weeks gestational age found a mean serum albumin of 19 g/l below 30 weeks gestational age rising to a mean of 31 g/l at term. There was a postnatal rise in serum albumin over the first three weeks, regardless of gestation at birth. Oedema was common in premature newborns but correlated poorly with serum albumin.

The main causes of hypoalbuminaemia in NICU are altered distribution between intravascular and extravascular body compartments (e.g. sepsis, NEC, CLD, IVH) and decreased synthesis due to inadequate nutrition. Other causes include increased losses and increased catabolism. Severe hypoalbuminaemia may be associated with marked peripheral oedema, respiratory distress (alveolar capillary membrane leak) and hypovolaemia. However, it is not clear that this relationship is causal, and there is no evidence that increasing the albumin level by albumin infusion improves the outcome.

Studies in adult intensive care associate hypoalbuminaemia with increased mortality. A systematic review of albumin administration in critically ill adults found no evidence that albumin administration reduced mortality and suggested that it may increase mortality in selected patients.

There is little evidence to support or refute the use of human albumin solution for low serum albumin in preterm infants. A Cochrane review in 2010 identified 2 small RCTs which met the inclusion criteria. The authors concluded that there was insufficient evidence to determine whether the use of albumin infusion in preterm neonates with low serum albumin reduces mortality or morbidity and no evidence to assess whether albumin infusion is associated with significant side effects.

What types of albumin solution do we have

The BNFC indications for human albumin solution include acute or sub-acute loss of plasma volume (5%, isotonic, 50g/L) or severe hypoalbuminaemia associated with low plasma volume and generalised oedema when salt and water restriction is required (20%, hyperosmotic, 200g/L).

The Trust blood products/components manual indicates that:

'Plasma protein solutions (Stable Plasma Protein Solution, 4.5%/5% Albumin or 20% Albumin) do not require to be infused through a blood giving set with a filter. A standard infusion set as used for crystalloids or synthetic colloids is suitable.' (pg15)

Albumin solutions are prepared from whole blood from multiple donors. They contain soluble proteins and electrolytes, but no blood group antibodies. Albumin is sometimes given after the acute phase of illness to correct a plasma-volume deficit. Concentrated albumin infusions may be used to obtain a diuresis in hypoalbuminaemic patients. Fluid overload is a potential side effect and albumin infusions should not be given without clear documentation of the indication.

How much

Dose 0.5 - 1g/kg/dose

5% 10 - 20 ml/kg over 1 hour

20% 2.5 - 5 ml/kg over 4 hours

Document the details of the product infused, including the batch number and expiry date in the patient's clinical records.

Inappropriate uses of albumin

Historically, albumin solutions were given as first line treatment for hypotension and at resuscitation. Several randomised studies were carried out and determined that improvement in blood pressure and urine output was due to the volume of fluid administered and not the protein content. There is no evidence that albumin reduces mortality when compared with other alternatives, such as normal saline. Hypotension may be due to myocardial dysfunction or low vascular tone rather than hypovolaemia, in which case care should be taken with fluid resuscitation.

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