Filterability of human serum albumin in parenteral nutrition administered to neonates through an in-line 0.2 micron filter

Dear Editor

The use of albumin infusions in neonates remains controversial. Hypoalbuminaemia is associated with necrotising enterocolitis and lung disease, however, correction of low serum albumin does not demonstrably improve neonatal morbidity or mortality.[1] Despite this, albumin is widely used in neonatal intensive care. Although commonly used, there is no clear guidance as to the most appropriate method of administration.

Previous clinical trials have either administered the total dose of albumin as a separate side-line over a period of 1-2 hours, or by adding it to parenteral nutrition and administering the total dose over 24 hours.[1] The latter approach offers the theoretical advantage of avoiding a rapid administration of albumin, reducing the potential risk of volume retention which can result in fluid overload and associated complications such as pulmonary oedema. For this reason, within our neonatal unit, when albumin is required it is often added to parenteral nutrition solutions (at a dose of 1-2g/kg/day) prepared by an on-site sterile production service. Our routine practice is to administer parenteral nutrition via a 0.2-micron in-line filter (PALL Posidyne NEO96, Pall Corporation, Port Washington, USA). However, there is no data on the extent of albumin capture by this type of filter.

We performed an in vitro experiment to investigate the extent of albumin capture by the in line filter during infusion of parenteral nutrition. We added 1.5mL of 20% albumin to 28.5mL of parenteral nutrition solution (Standard Preterm solution, Baxter Australia, Old Toongabbie, Australia) in a syringe resulting in a calculated albumin concentration of 10mg/mL. We then primed standard lines and infused the solution at 4mL/hour for 6 hours. This approach mimicked the concentration of albumin in parenteral nutrition solution in a clinical scenario where 1g/kg/d of albumin is delivered in 96ml/kg/d of total fluid to a 1kg baby. Samples for albumin analysis were collected prior to connection to the PAL filter, and every 60 minutes during the infusion period. Albumin analysis was undertaken using the bromocresol purple (BCP) method on a Roche Cobas c702 analyzer (Roche Diagnostics, Germany), which has a validated measuring range of 2g/L to 100g/L.

The baseline albumin concentration was 9.4mg/mL, and at 6 hours the level was 9.7mg/mL.. Concentrations at all time points varied by less than 6%, within the normal range of assay variability.

The results show that albumin was not filtered out of solution by the in line filter under the study conditions, demonstrating that albumin passes freely through this style of filter at therapeutic concentrations in combination with parenteral nutrition.

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