Albumin Therapy - Indications and contraindications

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Hypoalbuminemia may result from malnutrition, defective synthesis or excessive catabolism. The disruption of circulatory dynamics and loss of oncotic effects results in fluid retention leading to peripheral oedema and ascites.

The cold ethanol-water fractionation technique produces a concentrated solution of about 98% purity. Fever, chills and hypotension rarely encountered, are the result of antigen-antibody reaction, a hormone mediated vasodilatation or bacterial or endotoxin contamination.[1-6]

Pasteurization technique, although has considerably reduced the risk of transmission of hepatitis by serum albumin[7-8] but has not produced HBsAg free plasma as detected by radi oimmun oassay. Infectivity persists after heating HBsAg positive products at 60°C for 10 hrs.

In cirrhotics, serum albumin falls while serum globulin rises. Serum albumin concentration can be taken as a prognostic sign.[9-10] Patients showing lower rates of albumin synthesis often have more serious disease in term of survival time. [11] Infusion of salt poor albumin to cirrhotics causes a rise in serum albumin and reduces peripheral oedema, but ascites persists. With albumin infusion the concentration of albumin in ascitic fluid rises in accordance with the rise of serum albumin. Infusion of albumin has no long term beneficial effects on those with liver disease. Restriction of salt along with appropriate diuretic therapy are the only ways of controlling ascites and oedema.

A sense of well being has been reported with albumin infusion in cirrhotics, but controlled trials have shown no decrease in diuretic dose, improvement in fitness or working abality or change in the course of disease.[12] During short term therapy, albumin infusion alone is of little value,[13] but when used in association with diuretics, the effect is better.

Albumin infusion in those with liver disease and associted renal failure is used with a view that albumin would expand the intra vascular volume, increase the renal plasma flow and GFR, thereby preventing renal failure. This concept is not true, because GFR is not raised significantly.[14] During abdominal paracentesis removal of less than a litre of fluid is associated with a rise in cardiac output and stroke volume, due to reduction in intra abdominal tension and increase in venous return.[15] Fall in cardiac output and peripheral resistance does not occur untill more than 1.5 litres of fluid is removed in one sitting, thereby suggesting that not more than a litre of fluid should be removed per procedure, and removal of such an amount does not require plasma expanders.

The suggestion that albumin infusion might suppress albumin synthesis was ruled out by measuring albumin synthesis by C^{14} carbonate technique before and after infusion of 300grarns of salt poor albumin for 6 days A rise in serum albumin occured in all cases with no significant change in albumin synthesis.[16]

In malignant ascites when excessive amount of fluid is removed, the protien loss is not enough to require replacement[17]

In nephrotic syndrome large doses of albumin injections cause good diureses, but the effect is short lived because most of the injected albumin is excreted in the urine. In nephrotics with restricted diuresis, increasing uraernia or hyponatremla, infusion of salt poor albumin (45grams in 45 mins.) produces good diuresis, loss of weight and correction of biochemical levels[18]

In one third of new born infants with a cord protien level of less than 4.6grams/dl and a birth weight of less than 2.5kg. or a gestational age of less than 3 7weeks, develop fatal respiratory distress syndrome[19,20] Adminstration of albumin to such cases did not lower the mortality in controlled trials.[19]

In neonatal unconjugated hyperbilirubinaemia deficiency of albumin leaves a large fraction of bilirubin free or in diffusible form. This free biirubin is toxic and produces kernicterus, but the effect is short lived because 2/3rd of intravascular albumin diffuses into the extravascular compartment within 3 hours. Albumin infusion during exchange transfusion enhances the efficacy of exchange.[21]
Phototherapy when given along with albumin infusion gives better results in neonatal jaundice.
Albumin infusion to surgical cases expands their plasma volume, increases serum oncotic pressure and diminishes the net transfer of fluid from capillaries into alveoli, thereby preventing pulmonary oedema. Inappropriate albumin infusion to such cases might exacerbate respiratory failure. Use of diuretics along with albumin to surgical cases improves their respiratory functions.[22]
Within few hours of burns the plasma albumin falls; with an increase in extra vascular albumin and capillary permeability. The catabolism of albumin is increased, because of cutaneous loss and vascular damage and synthesis is depressed for several weeks, gradually returning to normal in 5-6 weeks.[23]
Isotonic fluid in first 24 hours. (4mg./kg/percentage of area burned) has been recommended[24], but this colloid free fluid produced more oedema and the volume required was also more. Hypertonic solutions were then advised,[25] but they increased the risk of hypernatremia and hyperosmolar coma.[26] Most physicians now recommend albumin infusion after first[24] hours of initial burn. A continuous albumin infusion to maintain serum albumin level between 2-2.SG/dl have been found use-full.[26]
Direct relationship exists between wound healing and nutritional status of the patient.[27]
Impaired healing is not due to the oedema of hypoprotienemia but is due to other effects of protien depletion, like lack of aminoacids for protien, especially collagen synthesis. Traumatic oedema fluid provides plasma protiens for swift repair of damaged tissues either due to surgery or burns.
In intestinal blind loop syndrome, overgrowth of bacteria results in deamination of amino acids before absorption; antibiotic therapy eliminates bacterial over growth and so causes return to normal of antino acid levels.[28]
After gastrointestinal surgery, albumin synthesis is enhanced in those receiving intravenous amino acids and electrolytes rather than those getting dextrose and electrolytes.[29]
Albumin therapy in hypoalbuminaemia has no other function except osmotic buffering and transport function already stated above.[30]

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