

HUMAN ALBUMIN INDICATIONS GUIDELINE

Absolute Indications

1. Large Volume Paracentesis in Patients with Cirrhosis

Defined as >4 L removed with documented cirrhosis (or any amount removed if creatinine is ≥ 1.5 gm/dL).

Dosing recommendation:

Albumin 20% 6-8 g per liter of ascitic fluid removed.

2. Plasmapheresis

Albumin, in conjunction with large-volume plasma exchange, is appropriate. Large-volume plasma exchange is defined as > 20 mL/kg in one session, or more than 20 mL/kg in repeated sessions.

- Crystalloid solutions and albumin/crystalloid combination should be considered as cost-effective alternatives for smaller volume exchanges.

Dosing recommendation:

Albumin 5% as per plasmapheresis protocol (based on plasma volume and serum fibrinogen level).

3. Spontaneous Bacterial Peritonitis (SBP) and cirrhosis

Defined as patients with ascitic fluid PMN counts ≥ 250 cells/mm³ plus at least one of the following:

1. Serum creatinine >1 mg/dL
2. Blood urea nitrogen >30 mg/dL
3. Total bilirubin > 4 mg/dL

Dosing recommendation:

Albumin 20% 1.5 g/kg within 6-hours of detection (day 1) and 1 g/kg on day 3

4. Diagnosis of Suspected Hepato-Renal Syndrome (HRS)

Defined as acute renal dysfunction (serum creatinine >1.5 mg/dL) in the presence of cirrhosis.

Dosing recommendation:

Albumin 20% 1 g/kg/day for 2 days (dose up to a maximum of 100 g per day).

5. Hepatorenal Syndrome (HRS), confirmed

Defined as:

- i. Serum creatinine >1.5 mg/dL in the presence of cirrhosis
- ii. Absence of shock, ongoing bacterial infection, and/or current treatment with nephrotoxic drugs
- iii. Absence of sustained improvement in renal function after discontinuation of diuretics and a trial of albumin 1 g/kg
- iv. Absence of proteinuria (<500 mg/day) or hematuria (<50 red cells per high-power field)
- v. Absence of ultrasonographic evidence of obstructive uropathy or parenchymal renal disease

Dosing recommendation:

1. Albumin 20% 25-50 g daily for a total of 72 hours (starting 1-2 days after initial diagnostic trial of albumin, if applicable), can last until 14 days and more if necessary.
2. Should be used in addition to midodrine and octreotide.

May Be Beneficial

1. Postoperative Volume Resuscitation After Cardiac Surgery

Albumin 5% may only be used if ≥ 3 L crystalloid has been administered within a given 24-hour period without an adequate hemodynamic response.

This only includes crystalloids given as a bolus (excludes maintenance fluids, carrier fluids, etc.)

This excludes fluid given intraoperatively

2. Major surgery

The use of albumin may be indicated in subjects undergoing major surgery ($> 40\%$ resection of the liver, extensive intestinal resection) when, after normalisation of circulatory volume, the serum albumin is < 2.5 g/dL

Dosing recommendation

Albumin 20%, 25 gm/day until albumin is ≥ 2.5 gm/dL. If serum albumin remains < 2.5 , may continue albumin dosing up to 4 days.

3. Refractory edema

For patients with severe hypoalbuminemia (plasma albumin < 2 g/dl) and refractory edema infusion of poor salt albumin with furosemide may be helpful. Sodium excretion must be monitored

Dosing recommendation

40-80 mg of furosemide with 200 ml of albumin 20% solution

4. Postoperative Heart Transplant

May be useful to treat anasarca in patients with albumin ≤ 3 gm/dL

Dosing recommendation

1. Albumin 20%, 25 gm IV BID x2 doses (or 12.5 gm IV q6h x4 doses) may be used in combination with diuretics.
2. Monitor urine output and volume status and assess daily. If successful at achieving diuresis, may reorder albumin until serum albumin is > 3 gm/dL but must be renewed each day after daily assessment.

5. Postoperative Lung Transplant

Grade 2 or higher Primary Graf Dysfunction

Dosing recommendation

Albumin 20%, 25 gm IV BID x2 doses (or 12.5 gm IV q6h x4 doses) for up to 48 hours may be used in combination with diuretics to improve oxygenation.

6. Postoperative Liver Transplant

May be useful for the control of ascites and peripheral edema if serum albumin is <2.5 gm/dl

Dosing recommendation

Albumin 20%, 25 gm/day until albumin is ≥ 2.5 gm/dL.

If serum albumin remains <2.5, may continue albumin dosing up to 4 days; consult liver surgeons thereafter for consideration of continued use.

7. Burns/Thermal Injuries

Use only for burns with greater than 50% BSA (body surface area) when unresponsive to crystalloid. After 24 hr: Maintain albumin conc. of 2.5 +/- 0.5g/100 mL or a total serum protein level of 5.2g/100mL

Dosing recommendations

All infusion days: Albumin 5% 0.3-0.5 mL/kg/BSA, usually 50-100 mL/hour or 1-2 mL/min

8. Severe Nephrotic Syndrome (e.g. with anasarca or pulmonary edema)

May be used in demonstrated nephrotic syndrome (>3 g/day of urinary protein excretion [or spot protein equivalent] + hypercholesterolemia + hypoalbuminemia) and loop diuretic resistance (defined as an "insufficient response" to an intravenous bolus dose of ≥ 160 mg furosemide or 4 mg bumetanide followed by ≥ 8 -hour infusion of ≥ 20 mg/hr furosemide or ≥ 0.5 mg/hour bumetanide)

Dosing recommendation

Albumin 20%, 25 gm in combination with diuretics to effect adequate diuresis.

9. Acute Lung Injury/Acute Respiratory Distress Syndrome

It may be considered, but not recommended

Use with Lasix(furosemide). NOT in the same IVF.

Dosing recommendation

Albumin 20% 25 g (100-200 ml) over 30-60 mins to target serum albumin concentrations >25 g/l. it may be Repeated every 8 hours for 3 days

10. Hypotension During Dialysis

These are some other options: saline infusions, adjust antihypertensives,

Caffeine, midodrine, extend dialysis duration.

Dosing recommendation

Albumin 20% 100 mL each episode of dialysis

11. Ovarian Hyperstimulation Syndrome- Treatment

It is not recommended, but it may be used

Dosing recommendation

Albumin 20% - 50 to 100 g over 4 hours and repeated at 4-12 hour intervals as necessary

12. Chronic PICU Patients with Hypoalbuminemia and Edema

May be considered

Dosing recommendation

Albumin 20% 3-4 mL/kg, once or twice a day

13. Hemolytic Disease of the Newborn

An FDA-approved indication for 20% albumin

- According to Micromedex, evidence is inconclusive
- Should not be administered in conjunction with phototherapy, nor should it be used **prior** to exchange transfusion.
- It has been used with mixed results as an adjuvant to exchange transfusions and should be administered **only with concurrent transfusion of blood.**
- **Crystalloids & non-protein colloids do not have bilirubin-binding properties and should not be considered as alternatives to albumin**

Dosing recommendation

1 g per kilogram body weight prior or during exchange transfusion

14. Cardiac Bypass, Circuit Priming

Possibly, depending on circuits used. Also institution/patient population specific

NOTE: some reports indicate the use of 20% albumin for this purpose. However, it is diluted with non-colloid solutions to approximately 5%

Dosing recommendation

Pediatric: weight dependent Adult: 1200 – 2000 mL

15. Volume Resuscitation for Hypovolemia

It is not routinely used, but albumin 5% may be considered.

NOTE: Albumin resuscitation in traumatic brain injured patients demonstrated a high mortality rate

16. Fluid Resuscitation for Sepsis

5% albumin may be appropriate

17. Nutritional Intervention

Albumin should not be used as a supplemental source of protein calories in patients requiring nutritional intervention.

- However, patients with diarrhea associated with enteral feeding intolerance may benefit from the

administration of albumin if all the following conditions are met:

- i. Significant diarrhea (> 2 liters per day) occurs;
 - ii. Serum albumin is < 2.0 g/dl;
 - iii. Continued diarrhea occurs despite trial of short-chain peptide and elemental formulas;
 - iv. Other causes of diarrhea have been considered and ruled out.
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18. Low Serum Albumin in Hemodynamically Unstable Patient in Critical Care (Albumin <2.5 g/dl)

Occasionally HAS 20% may be indicated.

Albumin administration at Low serum albumin in the absence of ascites, SBP or hepatorenal syndrome is not indicated.

Dosing recommendation

(desired albumin-serum albumin) × patient Wt × 0.8

19. Subarachnoid Hemorrhage

Cerebral Ischemia or hemorrhage as part of triple H therapy. If Hct is elevated crystalloid should be given as part of hemodilution.

Albumin can be given if: Aneurysmal subarachnoid hemorrhage

Goal CVP 6-8 to decrease risk of vasospasm

If delayed vasospasm occurs, CVP goal of 8- 12

Albumin administration may be helpful if serum albumin <3 g/dl

Dosing recommendation

5% albumin 250ml Q2-4H prn CVP goal; adjust rate of crystalloids by 25% if frequent boluses.

Should Not Be Used

- 1. As A Nutritional Intervention in Serum Albumin ≥ 2.5 G/Dl**
- 2. To Correct Hypoalbuminemia in Serum Albumin ≥ 2.5 G/Dl (With the Exception of The Particular Cases Listed Above)**
- 3. After Abdominal Surgeries (Hepatic and Abdominal Resection) In Serum Albumin ≥ 2.5 G/Dl or For A Patient Which Have Responded to Fluid Therapy.**
- 4. Wound Healing**
- 5. Burns in The First 24 Hours**
- 6. Acute or Chronic Pancreatitis**

Albumin Administration:

20% Albumin is hyperoncotic. The 100ml volume will expand to approximately 400mls within 25 minutes of transfusion. Rapid administration can lead to rapid volume expansion and cardiac failure. There is no UK published data regarding 20% Albumin infusion rates; in clinical practice it is usual to infuse 100mls over 30 minutes (personal communication AL/RS), but infusion rate varies and depends on clinical circumstances.

If 5% albumin bags are not available, may dilute 20% albumin vials with NS or D5W:

Albumin 5% - 250ml:

Withdraw 50ml from 250ml NS IV bag and add 50mL 20% albumin (12.5g) albumin.

Albumin 5% - 500ml:

Withdraw 100ml from 500ml NS and add 100mL 20% albumin (25g) albumin.

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Pediatrics :

No good published data, but it is common practice throughout Canada with anecdotal positive outcomes