

Ontario Albumin Administration Recommendations

Intravenous albumin is a human-derived blood product manufactured from plasma. Intravenous albumin is commonly prescribed to hospital inpatients (and outpatients with cirrhosis undergoing large-volume paracentesis) for a wide variety of clinical indications; however, its use varies widely across individual physicians and practice regions. Albumin is available in two formulations: 5% (iso-oncotic) and 25% (hyper-oncotic). The 5% solution has the same oncotic pressure as plasma and is used to maintain intravascular volume. 25% albumin is hyperoncotic and is roughly equivalent to a plasma volume four-to five-fold higher than the infused volume. A 100mL dose of 25% albumin provides 25g of albumin; similarly, a 500mL dose of 5% albumin provides 25g.

Intravenous albumin is expensive and can be associated with recipient adverse consequences. In 2024, the International Collaboration for Transfusion Medicine Guidelines (ICTMG) published guidelines for the use of intravenous albumin.¹ In this document, evidence-based recommendations for intravenous albumin are listed to assist clinicians in albumin prescribing decision-making for adult and pediatric patients. The harms of intravenous albumin are also listed.

Disclaimer: The Ontario Albumin Administration Recommendations are not intended to replace sound clinical judgment concerning a patient's unique clinical situation. Furthermore, although the advice and information contained in this document is believed to be true and accurate at the time of going to press, neither the authors nor the publishers can accept any legal responsibility for any errors or omissions that may have occurred.



ADULT RECOMMENDED INDICATIONS: 25% ALBUMIN

25% Albumin			
A. Patients with cirrhosis			
Indication	Details	Suggested Dose	Comments
Large volume paracentesis (cirrhotic ascites only) ²⁻⁴	Greater than 5L of ascitic fluid removed	6-8g of albumin per litre of ascitic fluid removed 5-6L: 100mL 7-8L: 200mL 9-10L: 300mL	- Recommended for the prevention of paracentesis-induced circulatory dysfunction (activation of the renin-angiotensin axis) - The data from the small clinical trials available is insufficient to determine if albumin improves patient important outcomes
Spontaneous bacterial peritonitis ⁵⁻⁷	Administered in combination with antibiotics	Day 1: 1.5g/kg Day 3: 1g/kg Risk of circulatory overload: Adjust dose to distribute evenly over 3-5 days	Recommended to reduce kidney impairment and mortality
Suspected or confirmed Hepatorenal Syndrome (HRS) ^{2,8,9}	Administered in conjunction with vasoactive agents (terlipressin 1 st line, norepinephrine if not available, midodrine if cannot access other agents)	Day 1: 1g/kg to a maximum of 100g or 400 mL Days 2-14: 25-50g per day	No randomized controlled trials comparing albumin to placebo or no treatment. ICTMG albumin guidelines could not provide a recommendation for this indication. However, recommended by several other clinical practice guidelines
Post liver transplant and resection	Follow hepatorenal and paracentesis guidelines where possible	N/A	Consider for intraoperative replacement in patients with cirrhotic ascites and/or perioperative renal failure



ADULT RECOMMENDED INDICATIONS: 5% ALBUMIN

5% Albumin			
Indication	Details	Suggested Dose	Comments
Plasma exchange ¹⁰	Replacement fluid except for thrombotic thrombocytopenic purpura (TTP)	Between 1 – 1.5 plasma volume exchange. Frequency and duration of treatment is patient and disease dependent	For disease-specific information refer to the American Society for Apheresis Guidelines on the Use of Therapeutic Apheresis in Clinical Practice¹⁰
Burns/thermal injuries ¹¹	Consider between 8-12 hours post burn, in patients with large burns (>25% TBSA) to reduce resuscitation fluid volume and improve urine output.	The hourly resuscitation fluid rate using lactated Ringers is converted to one-third 5% albumin and two-thirds lactated Ringer's solution, maintaining that ratio during titration to urinary output (maximum 300 mL/h of 5% albumin). Consultation with a burn center is strongly recommended.	- Not recommended by ICTMG albumin guidelines to improve mortality due to no benefit seen in 4 randomized controlled trials - Recommended by American Burn Association Clinical Practice Guidelines on Burn Shock Resuscitation to reduce fluid resuscitation volume and increase urinary output (moderate to strong confidence) - Impact on patient-important outcomes unclear



ADULT RECOMMENDED INDICATIONS: 5% ALBUMIN

5% Albumin			
Indication	Details	Suggested Dose	Comments
Burns/thermal injuries ^{11,12}	Consider between 8-12 hours post burn, in patients with large burns (>25% TBSA) to reduce resuscitation fluid volume and improve urine output.	Consultation with a pediatric burn center is strongly recommended.	Pediatric RCT showed early 5% albumin administration reduced crystalloid requirements, lowered fluid-creep, and reduced hospital length of stay



NOT INDICATED

Intravenous albumin is **not routinely recommended** in the following clinical scenarios:

- First-line volume resuscitation for hypovolemia in sepsis or septic shock^{5,13}
- Acute Respiratory Distress Syndrome¹⁴
- Traumatic Brain Injury¹⁵
- Acute ischemic stroke¹⁶
- In combination with diuretics for the removal of extravascular fluid^{17,18}
- Pediatric patients with infection and hypoperfusion^{19,20}
- Preterm neonates (≤ 36 weeks) with low serum albumin levels and respiratory distress²¹
- Preterm neonates (≤ 32 weeks or ≤ 1500 g) with or without hypoperfusion²²
- Cardiac surgery in children and adults:
 - Priming the cardiovascular bypass circuit²³ or perioperative volume replacement^{24,25}
- Patients with cirrhosis and:
 - Extrapertitoneal infections²⁶
 - Hypoalbuminemia²⁷
 - Hyponatremia²⁸
 - Outpatients with refractory ascites¹
- Adult nephrotic syndrome²⁹
- First-line treatment or prevention of intradialytic hypotension or for improving ultrafiltration³⁰
- Prevention of ovarian hyperstimulation syndrome³¹
- Oncologic surgery³²



POSSIBLE BENEFIT

Based on expert opinion, intravenous albumin may be considered for select patients with the following indications. However, these indications do not have sufficient evidence to recommend for all patients and are not currently supported by the ICTMG albumin guidelines.

- Pediatric nephrotic syndrome³³
- Adult patients with sepsis or septic shock who received large volumes of crystalloids^{34,35}
- Volume replacement for patients on extracorporeal membrane oxygenation³⁶



EVIDENCE OF HARM

The following randomized controlled trials showed patient harm with intravenous albumin:

Patient population	Comparison	Risk in albumin group
On-pump cardiac surgery ³⁷	4% albumin vs. Ringers acetate	Increased risk of bleeding, resternotomy, and infection
Cardiac surgery patients at high risk of acute kidney injury ²⁴	20% albumin vs. Standard of care	Increased risk of acute kidney injury
Decompensated cirrhosis (inpatient) and albumin <30g/L ²⁷	20% albumin vs. Standard of care	Increased risk of pulmonary edema, fluid overload
Cirrhosis and extraperitoneal infections ²⁶	Albumin vs. Control	Increased risk of pulmonary edema
Traumatic brain injury ¹⁵	4% albumin vs. Normal saline	Increased mortality
Pediatric cardiac surgery ²⁵	5% albumin vs. Crystalloid	Higher total fluid intake and longer ICU stay
Pediatric sepsis (predominantly malaria) ²⁰	5% albumin bolus vs. Crystalloid infusion	Increased mortality

Other known adverse effects of albumin include:

- Hypotension³⁸
- Anaphylaxis³⁹
- Hemodilution requiring RBC transfusion¹³



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