Mythbusters

Use of Intravenous Albumin: A Guideline from the International Collaboration for Transfusion Medicine Guidelines (ICTMG)

BREAKTHROUGHS IN BLOOD
ADVANCEMENTS INTO ACTION

Purpose

This resource was created in September 2024 for the *Breakthroughs in blood: Advancements into action* webinar series and is available on Canadian Blood Services' professional education website, Profedu.ca.

It is intended for educational or informational purposes supporting implementation of the Use of Intravenous Albumin: A Guideline from the International Collaboration for Transfusion Medicine Guidelines (ICTMG).

Authors

This resource has been compiled with the expertise of:

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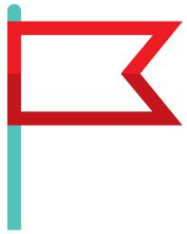
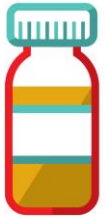
Myth #1:



There is no risk of harm with albumin as it is safer or “more natural” compared to crystalloid.

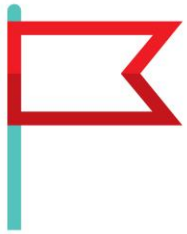
Reality:



In RCTs, intravenous albumin results in an increase in adverse pulmonary events.[1,2] In cardiac surgery, albumin results in an increase in bleeding and infections when compared to crystalloid.[3] The manufacturing process (alcohol fractionation, heat treatment) may impact its normal function.

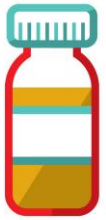
1. China, L et al. *New England Journal of Medicine* (2021).
2. Pesonen, E et al. *JAMA* (2022).
3. Wong, YJ et al. *Digestive and Liver Disease* (2020).

Myth #2:



Albumin is not very costly.

Reality:



Albumin is much more expensive than crystalloids.

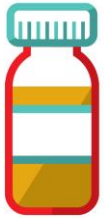
Albumin is manufactured from large volumes of plasma and is expensive (approximately $130/25 g United States dollars; warehouse acquisition cost of albumin), with the acquisition cost likely a fraction of the total health care expenditure.[4]

4. Shander, A et al. *Transfusion.* 2010.

Myth #3:

There is great evidence for the use of albumin in hepatorenal syndrome (HRS).

Reality:

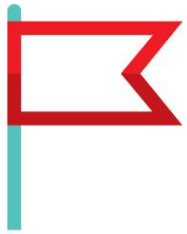


All prior trials[5,6] involving patients with HRS have administered albumin in both treatment and control arms while comparing vasoconstrictors (e.g., terlipressin, midodrine) to placebos.

Thus, it remains unknown if intravenous albumin is a beneficial (or harmful) component of regimens routinely used to treat patients with HRS.

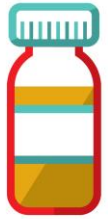
5. Thomson, MJ et al. *Digestive Diseases and Sciences* (2020).
6. Best, LM et al. *Cochrane Database of Systematic Reviews 9* (2019).

Myth #4:



Intradialytic hypotension (IDH) can only be treated with albumin, not crystalloid or pressors for ICU patients.

Reality:

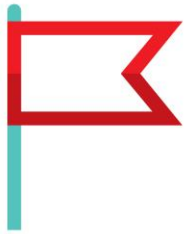


Not all IDH is due to intravascular volume depletion thus giving fluid is not always the appropriate treatment.

Small trials have reported transient hemodynamic improvements after hyperoncotic albumin was given during dialysis but no trials assessed clinically meaningful outcomes[7,8]. Given its cost and potential harms, albumin is not recommended for treating IDH over other options.

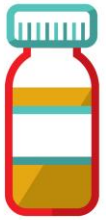
7. Hryciw, N et al. *Clinical Journal of the American Society of Nephrology* (2021).
8. Douvris, A et al. *Intensive Care Medicine* (2019).

Myth #5:



Low serum albumin is an appropriate indicator for albumin infusion in ICU patients.

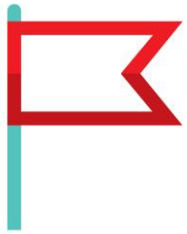
Reality:



The ALBIOS trial[9] randomized 1818 ICU patients with hypoalbuminemia to receive daily albumin versus crystalloid and found that although serum albumin levels increased with transfusion, there was no impact on mortality, organ dysfunction or length of hospital stay.

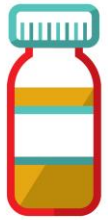
9. Caironi, P et al. *New England Journal of Medicine* (2014).

Myth #6:



Better diuresis is achieved in critically ill edematous patients with a “sandwich” of Lasix (furosemide) and 25% albumin.

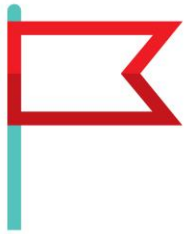
Reality:



While a couple of very small RCTs have examined this question, none have shown any difference with adding albumin to Lasix in improving patient-important outcomes in edematous ICU patients.[10]

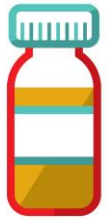
10. Oczkowski, SJ & Mazzetti, I. *Journal of Intensive Care* (2014).

Myth #7:



In sepsis, albumin should be used if additional fluid is required following infusion of several litres of crystalloid.

Reality:



In RCTs and systematic reviews evaluating the role of albumin in patients with sepsis, the use of albumin has not been found to be associated with improved outcomes.[11-15]

11. Tseng, CH et al. *Critical Care* (2020).
12. Patel, A et al. *BMJ* (2014).
13. Rochwerg, B et al. *Annals of Internal Medicine* (2014).
14. Bansal M et al. *Current Drug Safety* (2013).
15. Caironi, P et al. *New England Journal of Medicine* (2014).

Myth #8:

In extracellular fluid overload, 25% albumin should be used as a resuscitation fluid.

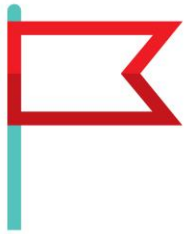
Reality:

Resuscitation fluid of any kind is very rarely indicated in the presence of extracellular fluid overload.

Speculation that using albumin as resuscitation fluid might limit dilutional hypoalbuminemia, thereby reducing the risk of pulmonary edema, has not been shown to be true.[16,17]

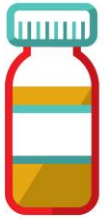
16. Gallager, TJ, Banner, MJ & Barnes, PA. *Anesthesia & analgesia* (1985).
17. Zarins, CK et al. *Circulation Research* (1978).

Myth #9:



Albumin should be given during large volume paracentesis to prevent hypotension.

Reality:

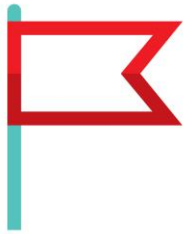


Albumin infusion is not routinely indicated before or during large volume paracentesis to prevent hypotension.

Albumin is only indicated if the volume removed exceeds 5 L, at a recommended dose of hyperoncotic albumin (20-25%) 6-8 g per liter of fluid removed.[18]

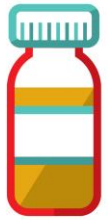
18. Kulkarni, AV et al. *Journal of Clinical and Translational Hepatology* (2020).

Myth #10:



Albumin should be given for malignant ascites, just like cirrhosis.

Reality:



Malignant ascites is an exudative process, unlike transudate ascites in cirrhosis thought to be driven by a low albumin level. Guidelines for malignant ascites do not recommend albumin administration.[19,20]

19. Matsusaki, K et al. *International Journal of Clinical Oncology* (2022).
20. Becker, G, Galandi, D & Blum, HE. *European Journal of Cancer* (2006).

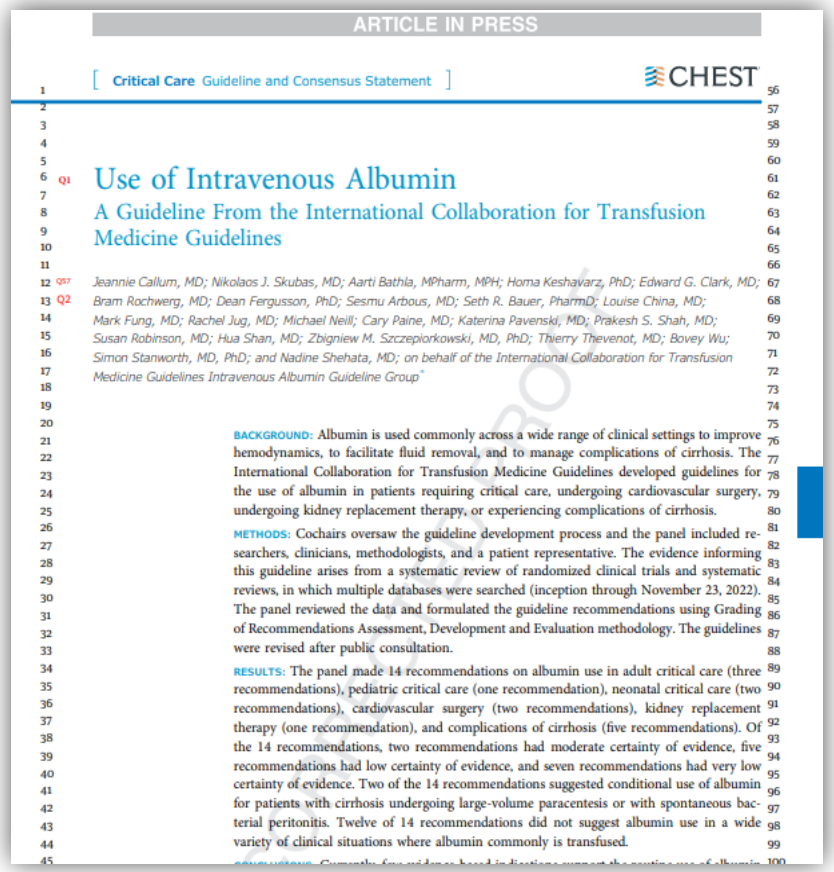
Key takeaways

Intravenous albumin is:

- A **human-derived blood product** manufactured from donated plasma.
- Used in a **wide range of clinical settings** to improve hemodynamics, facilitate fluid removal, manage complications of cirrhosis with **highly variable practice** between regions.
- **More expensive** to manufacture and provide to patients compared to crystalloids.
- **Associated with adverse consequences** in some cases including fluid overload, hypotension, hemodilution requiring red blood cell transfusion and anaphylaxis.

Callum, J et al. Use of Intravenous Albumin: A Guideline From the International Collaboration for Transfusion Medicine Guidelines. *CHEST* 166, 321-338 (2024).

Key takeaways



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[Critical Care Guideline and Consensus Statement] CHEST

Use of Intravenous Albumin

A Guideline From the International Collaboration for Transfusion Medicine Guidelines

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BACKGROUND: Albumin is used commonly across a wide range of clinical settings to improve hemodynamics, to facilitate fluid removal, and to manage complications of cirrhosis. The International Collaboration for Transfusion Medicine Guidelines developed guidelines for the use of albumin in patients requiring critical care, undergoing cardiovascular surgery, undergoing kidney replacement therapy, or experiencing complications of cirrhosis.

METHODS: Cochairs oversaw the guideline development process and the panel included researchers, clinicians, methodologists, and a patient representative. The evidence informing this guideline arises from a systematic review of randomized clinical trials and systematic reviews, in which multiple databases were searched (inception through November 23, 2022). The panel reviewed the data and formulated the guideline recommendations using Grading of Recommendations Assessment, Development and Evaluation methodology. The guidelines were revised after public consultation.

RESULTS: The panel made 14 recommendations on albumin use in adult critical care (three recommendations), pediatric critical care (one recommendation), neonatal critical care (two recommendations), cardiovascular surgery (two recommendations), kidney replacement therapy (one recommendation), and complications of cirrhosis (five recommendations). Of the 14 recommendations, two recommendations had moderate certainty of evidence, five recommendations had low certainty of evidence, and seven recommendations had very low certainty of evidence. Two of the 14 recommendations suggested conditional use of albumin for patients with cirrhosis undergoing large-volume paracentesis or with spontaneous bacterial peritonitis. Twelve of 14 recommendations did not suggest albumin use in a wide variety of clinical situations where albumin commonly is transfused.

ICTMG's Use of Intravenous Albumin guideline provides clinicians with actionable recommendations on indications for albumin use.

12/14 recommendations **do not** suggest albumin use in a wide variety of clinical situations where albumin commonly is transfused.

Scan to access the guideline on ICTMG.org →

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3. Wong, Y.J., Qiu, T.Y., Tam, Y.C., et al. Efficacy and Safety of IV albumin for non-spontaneous bacterial peritonitis infection among patients with cirrhosis: A systematic review and meta-analysis. *Dig Liver Dis* 52, 1137-1142 (2020).
4. Shander A, Hofmann A, Ozawa S, Theusinger OM, Gombotz H, Spahn DR. Activity-based costs of blood transfusions in surgical patients at four hospitals. *Transfusion.* 50(4):753-65. (2010).
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6. Best, L.M., Freeman, S.C., Sutton, A.J., et al. Treatment for hepatorenal syndrome in people with decompensated liver cirrhosis: a network meta-analysis. *Cochrane Database of Systematic Reviews 9*, Cd013103 (2019).
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19. Matsusaki, K., Aridome, K., Emoto, S., et al. Clinical practice guideline for the treatment of malignant ascites: section summary in Clinical Practice Guideline for peritoneal dissemination (2021). *Int J Clin Oncol* 27, 1-6 (2022).
20. Becker, G., Galandi, D. & Blum, H.E. Malignant ascites: systematic review and guideline for treatment. *Eur J Cancer* 42, 589-597 (2006).

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