COMMENTARY

Pro-con Debate: Should Synthetic Colloids be taken off the ICU Shelves?

Abhinav Gupta

Journal of Acute Care (2022): 10.5005/jp-journals-10089-0017

Fluids are the most administered intravenous treatment in intensive care. Fluid resuscitation is aimed at restoring end-organ perfusion and correcting physiological imbalance.[1] Choice of fluid and its use in clinical care has always remained a matter of debate. There have been innumerable trials to show the effect of fluids on organ systems. Assessments of fluid requirement and administration have been historically done in intensive care by clinical assessment, but in recent times static and dynamic monitoring is used for evaluation of fluid requirement and responsiveness. Composition of fluids has changed over the years with the clinical use based on its effect on physiology and evidence available on the relationship between specific disease states and different fluid solutions.

Colloids vs crystalloids have been an ongoing debate. Crystalloids can be categorized into nonbuffered (saline) and buffered solutions (Ringer's lactate, acetate, and maleate). The colloid comprises mainly gelatine, albumin, dextran, and hydroxyethyl starch solutions. Colloid solutions are thought to remain in intravascular space for a longer time, therefore, considered more efficient than crystalloids in terms of lesser volume required to achieve hemodynamic goals. However, the advantages have been shown by some of the trials to be offset by concerns of increased mortality and risk of acute kidney injury with colloids as compared to crystalloids and are generally more expensive.

However, the pro con debate on whether synthetic colloids should be taken off the shelves in intensive care units (ICUs) was relevant in this context.

The author in support of view that colloid should not be used in ICUs cited Saline versus Albumin Fluid Evaluation (SAFE) trial[2] and Albumin Italian Outcome Sepsis (ALBIOS) trial[3] showing no mortality benefit with albumin, but a higher mortality and increased incidence of use of renal replacement therapy with HES as compared to Ringer's acetate [Scandinavian Starch for Severe Sepsis/Septic Shock (6S) trial][4] and Ringer's lactate [Efficacy of Volume Substitution and Insulin Therapy in Severe Sepsis (VISEP) trial].[5] The author further mentioned that damage to endothelium can potentially lead to leakage of colloids in interstitium leading to risk of interstitial edema, further supporting the risks of colloids.

The arguments for supporting the use of colloids in intensive care by the author were based on no difference in mortality between HES and 0.9% NaCl use as evidenced from Colloids Versus Crystalloids for the Resuscitation of the Critically Ill (CRISTAL)[6] study in severe sepsis patients, Flexibility In Duty Hour Requirements for Surgical Trainees (FIRST) trial[7] in trauma patient and Cochrane analysis[8] of 69 studies and 30,020 participants that compared four colloids [starches, dextrans, gelatines, albumin or fresh frozen plasma (FFP)] with crystalloids.

Consultant in Intensive Care Unit, Royal Free Hospital, London, England

Corresponding Author: Abhinav Gupta, Consultant in Intensive Care Unit, Royal Free Hospital, London, England, Phone: +44 (0) 20 7794 0500, e-mail: abhinavchd@yahoo.co.in

How to cite this article: Gupta A. Pro-con Debate: Should Synthetic Colloids be taken off the ICU Shelves? J Acute Care 2022;1(1):25–25.

Source of support: Nil

Conflict of interest: None

Both the authors have convincingly argued their views citing extensive evidence from published trials.

To conclude, among the available fluids, crystalloids should be prioritized and remain the first choice in clinical scenarios when managing shock. The use of colloids in ICU remains controversial. The role of albumin is still debated, and there is evidence of its use in conditions like septic shock but should be avoided in traumatic brain injury. The indications and effects of gelatine, starch, and dextran in ICUs have so far remained unclear for critically ill patients with risks associated in terms of higher mortality and renal failure, until more data are available.

References

1. Martin C, Cortegiani A, Gregoretti C, et al. Choice of fluids in critically ill patients. BMC Anesthesiol 2018;18(1):200. DOI: 10.1186/s12871-018-0669-3
2. SAFE Study Investigators. A comparison of albumin and saline for fluid resuscitation in the intensive care unit. N Engl J Med 2004;350(22):2247–2256. DOI: 10.1056/nejmoa040232
3. Caironi P, Tognoni G, Masson S, et al. Albumin replacement in patients with severe sepsis or septic shock. N Engl J Med 2014;370(15):1412–1421. DOI: 10.1016/j.jemermed.2014.06.011
4. Perner A, Haase N, Guttormsen AB, et al. Hydroxyethyl starch 130/0.42 versus Ringer's acetate in severe sepsis. N Engl J Med 2012;367(2):124–134. DOI: 10.1016/j.ymed.2012.08.022
5. Brunkhorst FM, Engel C, Bloos F, et al. Intensive insulin therapy and pentastarch resuscitation in severe sepsis. N Engl J Med 2008;358(2):125–139. DOI: 10.1016/s0084-3873(08)79064-3
6. Annane D, Siami S, Jaber S, et al. Effects of fluid resuscitation with colloids vs crystalloids on mortality in critically ill patients presenting with hypovolemic shock: the CRISTAL randomized trial. JAMA 2013;310(17):1809–1817. DOI: 10.1001/jama.2013.280502
7. James MFM, Michell WL, Joubert IA, et al. Resuscitation with hydroxyethyl starch improves renal function and lactate clearance in penetrating trauma in randomized controlled study: the FIRST trial (Fluids in Resuscitation of Severe Trauma). Br J Anaesth 2011;107(5):693–702. DOI: 10.1093/bja/aer229
8. Lewis SR, Pritchard MW, Evans DJW. Colloids versus crystalloids for fluid resuscitation in critically ill people. Cochrane Database Syst Rev 2018;8(8):CD000567. DOI: 10.1002/14651858.CD000567.pub7