
In the ICU, the use of either 4 percent albumin or normal saline for fluid resuscitation results in similar outcomes in 28 days.

**Sepsis Occurrence in Acute Illness Patients (SOAP) Investigators:** A positive fluid balance is an important factor associated with increased 60-day mortality. Outcome among patients treated with RRT was better when RRT was started early in the course of the ICU stay.

**Mortality after Fluid Bolus in African Children with Severe Infection (FEAST Trial):** Fluid bolus significantly increased 48-hour mortality in critically ill children with impaired perfusion in these resource-limited settings in Africa.

A positive fluid balance after AKI was strongly associated with mortality. Post-AKI diuretic therapy was associated with 60-day patient survival in FACTT patients with AKI; this effect may be mediated by fluid balance.

Significantly less volume was required to achieve HDS for HES vs. NaCl in the initial phase of fluid resuscitation in severe sepsis patients with any difference for adverse events in both groups.

**Hydrosytrel Starch 130/0.4 vs Ringer’s Acetate in Severe Sepsis N Eng J Med 2006; 354:2058-69.**

Patients with severe sepsis assigned to fluid resuscitation with HES 130/0.4 had an increased risk of death at 90 days and were more likely to require renal-replacement therapy, as compared with those receiving Ringer’s acetate.

**Hydrosytrel Starch or Saline for Fluid Resuscitation in Intensive Care (CHEST):**

In patients in the ICU, there was no significant difference in 90-day mortality between patients resuscitated with 6% HES 130/0.4 or saline. However, more patients who received resuscitation with HES were treated with renal-replacement therapy.

**Association between a chloride- and chloride-resistant intravenous fluid administration strategy and kidney injury in critically ill adults. JAMA 2012; 308.**

The implementation of a chloride-resistant strategy in a tertiary ICU was associated with a significant decrease in the incidence of AKI and use of RRT.


The type of fluid, the dose, the rate of administration, the timing and the duration of the treatment are all equally important. Intensive balanced solutions have potentially several physiological relevant advantages, although the actual translation of such advantages into clinical practice is still pending. Intensive balanced solutions (including all the characteristics necessary for such definition) are effective on acti- vation, and exercise in favour of that of plasma, however, are not always available. Whether or not the use of intensive balanced solutions is beneficial in high-risk patient categories (sepsis, trauma, burn), when compared with NaCl or when higher of risk of AKI, still needs to be investigated. Moreover, further research on the potential mechanisms underlying the clinical effects observed on specific types of clinical situations is warranted.

**Restricting volumes of resuscitation fluid in adults with severe sepsis and septic shock. The CLASSIC randomized controlled trial.**

A protocol restricting resuscitation fluid successfully reduced volumes of resuscitation fluid compared with a standard protocol in ICU patients with sepsis and septic shock. These patient-centered outcomes all pointed towards benefit with fluid restriction, but our trial was not powered to show differences in these exploratory outcomes.


PLR is a potential and attractive method for assessing fluid status in critically ill patients. Before the era of PLR for fluid management, more attention should be paid and further research should be provided regarding the delusion of PLR in clinical practice.

**Fluid overload in the ICU: evaluation and management. *Meta-Analysis 2016; 117.10 Cluzeau GA Grasset.*

In patients with fluid overload, fluid restriction should be recommended due to several complications like pulmonary edema, cardiac failure, delayed wound healing, tissue perfusion impairment, and impaired bowel function. Therefore, fluid restriction is crucial in the early management of critically ill patients. Diuretics are frequently used as an alternative to fluid restriction; however, the limited efficacy of diuretics and the high recurrence rate of fluid overload needs to be treated. Several diuretics and replacement techniques are often required for fluid overload treatment. Successful fluid overload treatment depends on precise assessment of individual patient's understanding the principles of fluid management with ultrafiltration, and clear treatment goals.

A rational approach to fluid therapy in sepsis. Br J Anesth 2016. Mark. Data suggest that a physiologic, haemodynamically guided approach to fluid therapy in patients with sepsis would be prudent and would likely reduce the mortality and improve the outcome of this disease.

**Fluid Balance in Patients with Acute Kidney Injury: Emerging Concepts.**

This review will present fluid balance in acute kidney injury (AKI). Critical care is credited with achieving remarkable renal recovery in critically-ill patients. It is therefore important to understand that fluid therapy and its impact relates to the critical care unit in a dynamic process.

**Effects of Fluid Resuscitation With Cobaltic or CrystaCobaltic on Mortality in Critically Ill Patients With Respective Perfusion:**


**Intraoperative Perfusion Therapy for Adults. Ulster Med J 2013. Mac Sweeny.**

In summary, preservative free fluids only where necessary, for as short a period as possible, and monitor the patient closely and biochemically. Use Hartmann’s solution, unless there is a serious reason to use saline or lactated Ringer’s and very consider what advantage the provision of a colloid will actually provide.

**Dose and type of crystalloid fluid therapy in adults with sepsis. Perioperative Medicine 2013. Smorenberg.**

Inotropic and hypotonic crystalloids are the fluids of choice for resuscitation in septic shock. The evidence that balanced solutions are superior to conventional fluids has been confirmed.

**Indications and management of mechanical fluid removal in critical illness.**

In patients with severe sepsis, albumin replacement in addition to crystalloids, as compared with crystalloids alone, did not improve the rate of survival at 28 and 90 days.


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**Replacement in Patients with Severe Sepsis: A Randomized, Double-Blind, Placebo-Controlled Trial.**

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**Passive leg raising free rates, no stop of fluid! CRIT Care 2015; Monnet. The Famous 5 Rules.**

Fluids are a cornerstone of the management of critically ill patients with sepsis: inflammatory response syndromes who are at risk of metabolic stress and fluid imbalance. However, with any therapy, fluids can be associated with harms, such as added or worsening organ dysfunction. Therefore, patients should be warned from fluids when contraindicated. This approach can be critical in the septic patient.

**Effect of a Buffered Crystalloid Solution vs Saline on Acute Kidney Injury Among Patients With Sepsis and Septic Shock (Splint Trial): JAMA 2015. Young.**

**Postoperative fluid management. World J Crit Care Med 2015. Hayashi.**

**The Use of Fluids in Seizures. Curr Opin 2016. Koepke.**

It is well established that fluid resuscitation is a central component of sepsis management; however, to date there is no consensus as to the ideal composition of fluid used for resuscitation, and it is unclear whether a single fluid composition is superior to others, as well as the historical background behind fluid selection for volume resuscitation. In conclusion, fluid resuscitation is a complex problem in epilepsy; the best fluids remain unknown.

**Early fluid loading for septic patients: Any evidence to support? Journal of TraumaTherapy 2017. Gong.**

Fluid loading is fundamental for assessing and reversing hypovasculature in patients with sepsis and shock. However, the evidence regarding the optimal fluid repletion strategy for sepsis remains uncertain. In fact, practice of aggressive fluid loading, especially those for beyond recommended resuscitation goals, may risk potential to administer excessive fluids to septic patients, which was highly associated with worse outcomes. Therefore, a safety line will be a big step forward for fluid optimization.


A balanced fluid is preferred over saline, regarding the balance of sodium and potassium levels. However, in critically ill adults, the use of balanced cocktails for intravenous fluid administration resulted in a lower rate of the composite outcome of death from any cause, new renal replacement therapy, or persistent renal dysfunction than the use of saline.