Fluids for Sepsis
Guidance from the Surviving Sepsis Campaign 2016

- The recommendation, for the initial fluid resuscitation from sepsis-induced hypoperfusion, is to infuse at least 30 mL/kg of intravenous crystalloid fluid within the first three hours.
- Fluids should be administered for hypotension, lactate ≥ 4 mmol/L or septic shock.
- The recommendation is to provide initial fluid resuscitation rapidly; do not infuse using an IV pump.
  - For example, give 1-liter IV fluid over 15 minutes using a pressure bag.
- More rapid administration and greater amounts of fluid may be needed in patients with sepsis-induced tissue hypoperfusion.
- Administration of 30 mL/kg crystalloid fluids is recommended in patients with end-stage renal disease on dialysis or chronic heart failure with frequent assessment of patient’s oxygenation status.
- Additional fluids should be guided by frequent reassessment of hemodynamic status. See also Optimizing Fluid Management in Sepsis Patients.
- Recommended measurements include MAP, BP, HR, urine output, capillary refill, cardiac ultrasound, ScvO2, lactate clearance.
- Dynamic pressure measurements such as pulse pressure variation and stroke volume variation are recommended to evaluate fluid responsiveness in patients with sepsis.
- Traditional hemodynamic measurements such as CVP or PAOP are no longer recommended due to their static nature (measure only a point in time) and their inability to predict fluid responsiveness.
- Recommended resuscitation end-points are:
  - MAP > 65 mmHg
  - Normalization of the lactate
  - Dynamic measurement indicates patient is no longer fluid responsive

Key articles:

- Fluid Resuscitation and Clinical Outcomes in Patients with Known Heart Failure Who Develop Severe Sepsis or Septic Shock. (2016). CHEST. https://doi.org/10.1016/j.chest.2016.08.363
The diagram below explores the nuancing of initial administration of 30 mL/kg crystalloid for sepsis-induced hypoperfusion based on patient characteristics. It also draws attention to reassessment tools following the initial dose as an influence on further fluid administration or inotropic therapy (Dellinger, 2017, open access).

**Application of Fluid Resuscitation in Adult Septic Shock**

- **Sepsis-induced hypotension or lactate ≥ 4 mmol/L** (Based on SSC bundle and CMS threshold)
  - **No high flow oxygen and No ESRD on dialysis or CHF**
  - **Pneumonia or ALI with high flow oxygen requirements**
  - **ESRD on hemodialysis or CHF**

  **Rapid infusion of 30 mL/kg Crystalloid**

  - **Not intubated/mechanically ventilated**
  - **Intubated/mechanically ventilated**

  **Consider intubation/mechanical ventilation to facilitate 30 mL/kg crystalloid**

  **Total of 30 mL/kg with frequent reassessment of oxygenation**

  **If no**

  **Total of 30 mL/kg with frequent reassessment of oxygenation**

  **Administer 30 mL/kg crystalloid within first 3 hours**

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**Considerations post 30mL/kg crystalloid infusion**

1. Continue to balance fluid resuscitation and vasopressor dose with attention to maintain tissue perfusion and minimize interstitial edema
2. Implement some combination of the list below to aid in further resuscitation choices that may include additional fluid or inotrope therapy
   - blood pressure/heart rate response,
   - urine output,
   - cardiothoracic ultrasound,
   - CVP, So2,
   - pulse pressure variation
   - lactate clearance/normalization or
   - dynamic measurement such as response of flow to fluid bolus or passive leg raising
3. Consider albumin fluid resuscitation, when large volumes of crystalloid are required to maintain intravascular volume.

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**References**