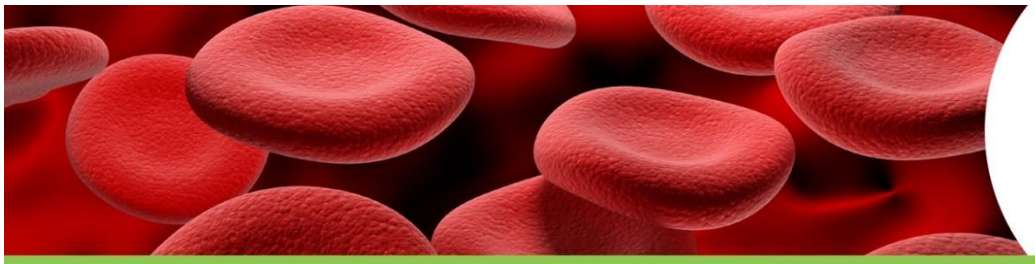


CHA SEPSIS

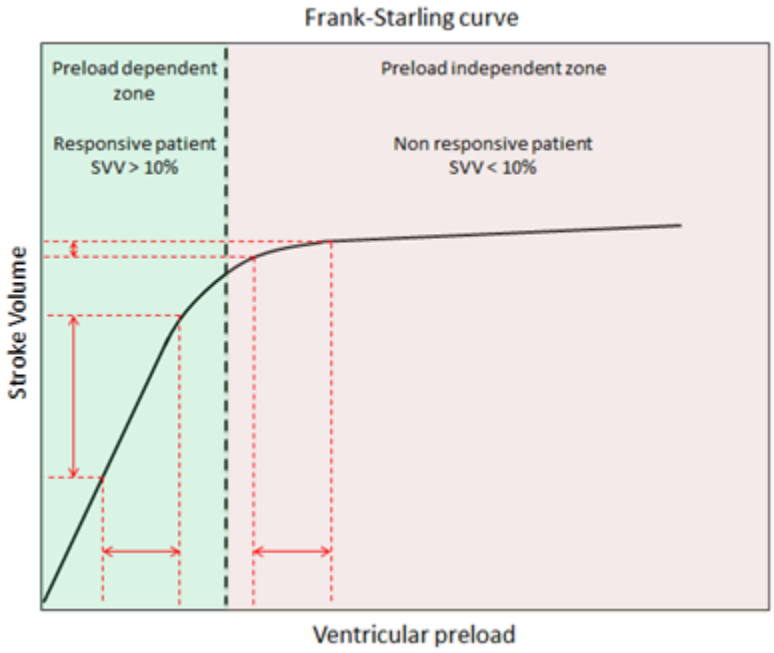
# Optimizing Fluid Management in Sepsis Patients

**What is fluid responsiveness?**

- Fluid responsiveness is the positive or negative response of cardiac stroke volume to moderate intravascular fluid administration to assess the benefit of fluids on circulation and perfusion.

**Why check fluid responsiveness? Why does this matter?**

- Especially in the initial treatment of sepsis, adequate volume resuscitation can help prevent organ damage.
- Finding the physiologically appropriate balance of fluids for each patient is a challenge. Patients with too little volume resuscitation do not perfuse their organs; however, too much fluid causes third spacing of fluids and secondary damage to tissues.
- These techniques help identify patients who are on the ascending portion of their Frank-Starling curve and will have an increase in stroke volume in response to fluid administration. Once they reach optimal volume the curve flattens, and volume is no longer beneficial.
- Fluid responsive patients have “preload reserve” and will have an increase in stroke volume (and usually cardiac output) when fluid is administered. See also *Fluids in Sepsis*.

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# How to Assess Optimal Fluids

**Static vs Dynamic Assessments**

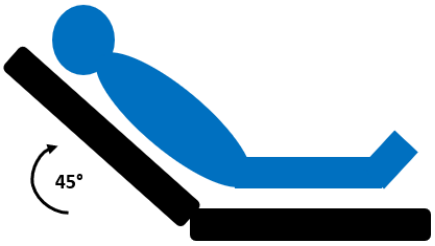
**Static Assessments**

- Static Clinical Endpoints: heart rate, blood pressure, collapsed veins, capillary refill time, urine output
  - not sensitive and poor inter-observer reliability
- Central Venous Pressure (CVP)/Pulmonary Capillary Wedge Pressure
  - require invasive lines and are poor predictors of volume status
- Chest x-ray (looking for pulmonary edema)
  - unreliable and a late sign

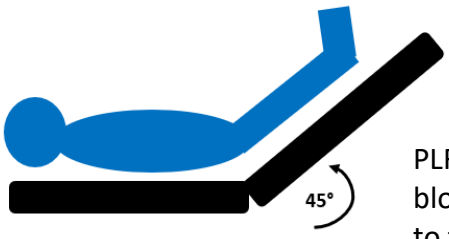
**Dynamic Assessments** (more sensitive and specific than static tests)

- Fluid Bolus Challenge
  - A fluid bolus challenge is a rapid infusion of 250 mL or 500 mL of normal saline or lactated Ringers over five to 10 minutes to test for fluid responsiveness
  - Assessment can be with change in pulse pressure, ultrasound of the vena cava collapsibility, bedside echocardiogram, non-invasive cardiac output monitor, carotid doppler flow or capnography (if ventilation and metabolic status are constant)

- Passive Leg Raise (PLR)
  - A PLR transiently increases venous return in patients to test for fluid responsiveness, acting as a pseudo-bolus of the patients' lower extremity blood to see the effect of increased volume on the work of the heart without having to give additional fluids.
  - This technique is contraindicated in patients with lower extremity amputations, significant peripheral vascular disease and pregnancy. Always monitor for patient tolerance and stop for discomfort or respiratory distress.



Semi-recumbent position



Passive leg raise

PLR moves blood from legs to thoracic area

- PLR Technique:
  1. Raise patient's head of bed to 45 degrees for five minutes
  2. Lower patient's upper body to horizontal while passively raising their legs up to 45 degrees for 30-90 seconds.
  3. Assess for at least a 10 percent increase in stroke volume by cardiac output monitor or using a surrogate such as change in ultrasound of the vena cava collapsibility, bedside echocardiogram, non-invasive cardiac output monitor or carotid doppler flow. If using capnography assess for a five percent increase of $etCO_2$.

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