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FAST FLUID FACTS

GIVING FLUID TO PATIENTS WITH CHF AND SEPSIS

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BACKGROUND

Both Heart Failure and sepsis are common conditions today. Heart failure (HF) is the most common reason for hospitalization in older adults, with approximately $30 billion spent annually for treatment.[1] In 2013, treatment for sepsis in hospitals cost nearly $24 billion and was responsible for 6.2% of all hospital costs across the country.[2] Given how common both sepsis and CHF are today, we will continue to see increasing numbers of CHF patients presenting with sepsis and septic shock.

Patients with both CHF and sepsis create a special challenge for bedside clinicians. We are naturally cautious with fluid administration in CHF patients to avoid volume overload. However, septic patients are often intravascularly depleted and require aggressive resuscitation.[3] How do we best manage these competing objectives in CHF patients with sepsis? The answer, as with all patients is to understand intravascular fluid status and perfusion. First, is perfusion adequate? If not, will additional intravascular fluid improve perfusion? A passive leg raise will answer this second question. CHF patients, especially septic ones, may be intravascularly depleted and benefit from additional fluid.

CASE STUDY — STROKE VOLUME CHANGES FIRST

An 86-year old female with history of congestive heart failure, end stage renal disease, and triple coronary artery bypass grafting presented to the Emergency Department with flu-like symptoms, an elevated BNP, and a lactate of 8 mmol/L. She was diagnosed with sepsis. Her MAP was 55 and received 30 mL/kg guided by stroke volume prior to her admission to the ICU for persistent hypotension. Using dynamic assessments in the ICU, the bedside provider was able to administer an additional 1.5L of fluids to the patient. The patient was never placed on vasoactive medications, was transferred out of the ICU the following day, and was discharged home 4 days later. Patients with a diagnosis of HF should be evaluated with dynamic assessments to determine fluid responsiveness — especially in the case of sepsis and septic shock. Careful intravascular volume expansion, using SV-guided fluid responsiveness, can be used to improve perfusion.

Clinical Scenario

- 86 yo Female. Presented to the ER with flu like symptoms > Sepsis
- Hx of CHF, ESRD, CABG x3
- MAP 55

Actions Taken — Change of Clinical approach

- **Patient received 30mL/kg of NS in the ER**
- **Patient admitted to the ICU as blood pressures were borderline**
- **Patient was admitted to ICU and PLRs were conducted**
- **PLR results = Δ SVI 20%, 14%, 11%**
- **≥ 10% SVI indicated patient was likely fluid responsive**
- **Patient received another 1.5 L of LR total with the PLR results**
- **Patient never received any pressor support, was transferred out of the ICU within 16 hours, and was discharged home 4 days later**

KEY TAKEAWAY
Stroke volume guided fluid management can help guide fluid expansion in CHF patients with sepsis.

References:
1. Dharmarajan, K., & Rich M.W. Epidemiology, Pathophysiology, and Prognosis of Heart Failure in Older Adults. Heart Failure Clinics 2007; 381-387.
2. Torio C and Moore B. National Inpatient Hospital Costs: The Most Expensive Conditions by Payer, 2013. HCUP Statistical Brief #204. May 2016. Agency for Healthcare Research and Quality, Rockville, MD.
3. Hoste, EA et al. Four phases of intravenous fluid therapy: a conceptual model. British Journal of Anaesthesia 2014; 113:740–747.

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