How Much is too Much: Examining Fluid Responsiveness in Septic Patients

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Examining Fluid Responsiveness in Septic Patients
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Literature Review
• Monitoring techniques and fluid resuscitation are transitioning from pressure-based (CVP) to flow-based parameters (CO and SV)^2
• Clinical studies have demonstrated approx. 50% of hemodynamically unstable critically ill patients are volume responsive^4
• Pulse-contour technology (PCT) showed fewer severe complications from over/under fluid resuscitation^3

Current Standings
Sepsis expected mortality rate: 26.44%
Present mortality rate: 30.74%

Our current ICU practice for fluid management – conventional assessments:
Heart Rate, Blood Pressure, Mean Arterial Pressures, Urine output, Central Venous Pressure, Level of Consciousness

These values are problematic:
• Slow to change
• Often late indicators of a patient’s worsening condition
• Do not take into account if patients are fluid responders vs. non fluid responders
• This study hypothesized that utilizing pulse contour technology will improve septic patients outcomes

Purpose
To determine if utilizing non-invasive pulse contour technology is an effective tool in measuring fluid responsiveness while managing septic patients and overall improving patient outcomes

Methods
• Research Design:
  • PCT algorithm feasibility study
    • N = 50
  • Compared to retrospective chart review
    • N = 50
• Inclusion Criteria:
  • Adults admitted to the ICU from ED with sepsis not in atrial fibrillation
• Setting:
  • 300-Bed Community Hospital
  • 28-Bed ICU
• Outcomes Measured:
  • Mortality rate 2 to sepsis
  • ICU Length of Stay
  • Ventilator days
  • Additional Procedural

• Algorithm Utilized:

  BP/MAP  \[\text{Check Stroke Volume}\]
  If SV is < 60 mmHg recommended vasopressors to MD
  If SV < 60 give 250cc fluid bolus
  If SV does not increase by 10% start vasopressors
  If SV increases by 10% continue to give 250cc bolus until SV no longer increases by 10%

Procedure:
Stroke Volume as a fluid responsiveness indicator
Primary RN reviews that patient met all 3hr sepsis bundle requirements
MD to make decision on plan of care with given SV as to administer fluid or start/maintain vasopressor support

Results and Outcomes
Prospective feasibility of algorithm:
• PCT algorithm applied 92.3% (n = 46)
• 62% were considered in fluid overload
• No statistical significance in fluid overload and procedures performed

Prospective VS Retrospective outcomes
• Mortality ↓ from 31% to 22%
• Ventilation days ↓ from 5.3 to 1.3
• ICU length of stay ↓ from 6.4 to 3.2 days

Implications
• Utilizing PCT and algorithm to guide fluid management in sepsis patients to determine if a patient needs vasopressors versus fluids demonstrated positive outcomes.
• Going further it can assist in bed selection from ER, or RRT; identifying if septic patient requires ICU for vasopressor therapy or step down unit for further fluid resuscitation. It would be beneficial to conduct a larger scale study to determine if the results translate beyond our community hospital setting.

References
1. Upon Request

Blue: Patients with Standard Treatment
Green: Patients with PCT and Fluid Responsiveness Management