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Outcomes of Sepsis Patients using Noninvasive Cardiac Output Monitoring to Guide Fluid Resuscitation



Homestead Hospital

BAPTIST HEALTH SOUTH FLORIDA

Introduction /Background

- Severe sepsis and septic shock continue to be major healthcare problems in most critical care units.
- Hospitalized patients with sepsis are at high risk for mortality during their stay. Early fluid resuscitation of the septic patient is a mainstay in the early management to improve outcomes (Dellinger, 2013).
- A concern is that patients are not receiving the recommended 30ml/kg due to a concern for fluid overload (Dellinger, 2013).
- The use of a noninvasive cardiac output monitor (NICOM[®]) has the ability to identify patients who are fluid responsive (i.e. need more fluids) versus those that are not. This monitor may help guide the healthcare team to manage the patient's fluid balance more effectively.
- The monitor provides continuous readings of the cardiac output, cardiac index, stroke volume, stroke volume index, peripheral vascular resistance and peripheral vascular resistance index (Marik et al., 2011)
- A passive leg raise maneuver or fluid challenge is used to assess the patient's fluid responsiveness (Marik et al., 2011; Cavallaro et al., 2010).



Specific Aims

Do critically ill patients with sepsis, severe sepsis, or septic shock who were exposed to the use of a nurse driven protocol for NICOM[®] have improved mortality outcomes when compared to similar patients that were not exposed to NICOM[®]?

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- **IRB:** April 16, 2014
- **Design**: Retrospective, matched case-control study.
- **Data collection:** Chart review.
- Study period: April 2014 January 2016 Sample:
 - Matched case control
 - Minimum sample size: 200

 - Age, gender, sepsis severity, race, APACHE score, co-morbidities.
 - Case definition: Adult ICU patients with sepsis, severe sepsis & septic shock who received NICOM-based fluid resuscitation.
 - **Control definition**: Adult ICU patients with sepsis, severe, sepsis & septic shock who received fluid resuscitation without the use of NICOM.
- Analysis:
 - Descriptive statistics and analytical statistics.
 - Mann-Whitney U, etc.)
 - Multiple logistic regression to determine predictive value of NICOM[®] exposure on mortality outcome.



Case-control Research Design



Methods

Variables used to match cases and controls:

Group comparison tests (Chi-square, T-test or



Figure 43. Comparison of APACHE Severity-adjusted Mean Ratios for Hospital Mortality and ICU Mortality by Level of Sepsis



• Study is in the data collection phase.

Cavallaro, F., Sandroni, C., & Marano, C. et al. (2010) Diagnostic accuracy of passive leg raising for prediction of fluid responsiveness in adults: systematic review and meta-analysis of clinical studies. Intensive Care Medicine, 36, p. 1475-1483. Dellinger, R. L. (2013). Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2012. Critical Care Medicine, 38, p.

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Preliminary Results

v v

Lower is better

Conclusions

References

• Marik, P.E., Monnet, X., & Teboul, J.L.(2011) Hemodynamic parameters to guide fluid

• Squara, P., Denjean, D., & Estagnasie, P. et al. (2007). Noninvasive cardiac output monitoring (NICOM): a clinical validation. *Intensive Care Medicine, 33*, p. 1191-1194.

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