INTRODUCTION
Following implementation of the Surviving Sepsis Campaign 3-hour and 6-hour care bundles for management of sepsis patients in 2013, a significant decrease in mortality and hospital length of stay has been observed on an international scale (Levy, et al). The care bundles consist of the following measures:

To be completed within 3 hours from time of presentation:*  
1. Measure lactate level  
2. Obtain blood cultures prior to administration of antibiotics  
3. Administer broad spectrum antibiotics  
4. Administer 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L.  

*“Time of presentation” is defined as the time of triage in the emergency department or, if presenting from another care venue, from the earliest chart annotation consistent with all elements of severe sepsis or septic shock ascertained through chart review.

To be completed within 6 hours from time of presentation:
5. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥65mmHg  
6. In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥4 mmol/L, re-assess volume status and tissue perfusion.  
7. Re-measure lactate if initial lactate elevated.  

In an international multicenter study, use of these bundles indiscriminately in sepsis patients have demonstrated up to a 40% reduction in hospital mortality (Rhodes, et al). However, due to provider concern over iatrogenic fluid-overload, bundle compliance with intravenous fluid (IVF) resuscitation in fluid-sensitive patients such as those with congestive heart failure (CHF) and/or renal failure (RF) remains a subject of debate. To date, there are no studies examining outcomes in bundle-managed sepsis patients specifically with CHF and RF comorbidities.

OBJECTIVES
• To assess hemodynamic and respiratory interventions, as well as mortality rates of fluid-sensitive adult sepsis patients who received bundle-compliant fluid resuscitation for sepsis.  
• Present clinical data to aid decision making in fluid-sensitive sepsis patient population.  
• Decrease morbidity and mortality in fluid-sensitive sepsis patients.

MATERIALS AND METHODS
• Retrospective descriptive study at Hawai‘i Pacific Health Medical Centers (Stuuab, Pali Momi, Wilcox)  
• Inclusion Criteria  
  ○ Age ≥ 18  
  ○ ICD code for Severe Sepsis/Septic Shock  
  ○ Diagnosis of Congestive Heart Failure and/or Renal Failure (≥7 days prior to severe sepsis event)  
  • CHF: ≥1 inpatient admission for primary CHF diagnosis or ≥2 encounters within a 12-month period  
  ○ Discharge/Death date must be between July 2013-August 2017  
• Exclusion Criteria  
  ○ Transfer in from another acute care facility  
  ○ Length of stay >120 days (Admission – Discharge date)  
  ○ Comfort care directive within 3 hours of presentation  
  ○ Patients receiving IV antibiotics for >24 hours prior to presentation  
• Metrics  
  ○ Most recent glomerular filtration rate and/or ejection fraction (prior to sepsis event)  
  ○ Amount of fluids administered within 3-hour period from presentation  
  ○ Administration of:  
    ▪ Diuretics (e.g. Furosemide, HCTZ, Acetazolamide, Mannitol)  
    ▪ Vasopressors (e.g. Norepinephrine, Epinephrine, Dopamine)  
    ▪ Colloid/Blood Products (e.g. Albumin 5% or 25%, Hetastarch/Dextran, pRBCs, FFP)  
  ○ Requirement of:  
    ▪ BiPAP  
    ▪ Intubation  
    ▪ Continuous Veno-Venous Hemofiltration (CVVH)  
• Inpatient Mortality  
• Statistical Analysis  
  ○ Student’s 2-sample t-test was used compare inpatient mortality  
  ○ Multivariate logistic regression analysis was used to obtain odds ratio (OR)  
  ○ Multivariate logistic regression model was used to obtain adjusted odds ratio (aOR) adjusted by BMI, Sex, Length of Stay, CVVH, Intubation and BiPAP

RESULTS
326 (315 males, 114 females) patients with CHF/RF and severe sepsis/shock received fluids and were included in this quality improvement project. Mean age was 63 years old.

OBJECTIVES
• Patients with congestive heart failure and/or renal failure with severe sepsis or septic shock who received bundle-compliant fluid resuscitation had a statistically significant decline in mortality rate.  
• Among CHF patients stratified by ejection fraction, a lower mortality rate is seen in all groups.  
• Fluid-sensitive patients may benefit from bundle-compliant fluid resuscitation.

FUTURE DIRECTIONS
• Determine if patients are presenting with active signs/symptoms of CHF/RF at the time of sepsis encounter.  
• Differentiate patients based upon clinical severity (e.g. APACHE-2) and volume status at the time of sepsis presentation.  
• Document clinical reasoning if fluids not administered

REFERENCES

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