

The effects of Post-Resuscitation Sepsis Management on Length of Stay and Total Cost of Care among Patients with Severe Sepsis in the ICU setting

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Post-Resuscitation Sepsis Order Set (PRSOs)

- Background
 - Each year in the United States of America, around 1.7 million people develop sepsis of which nearly 270,000 people die (CDC Report 2020).
 - Evidence shows that early resuscitation is critical to prevent progression to organ dysfunction and ultimately death in patients with severe sepsis (Rhoades et al, 2017)
 - There continues to be strong evidence between bundle administration (Levy et al, 2018) and survival, there remains limited or disjointed information about what the effect of timely post-resuscitative sepsis management has on patient outcomes.
 - Although studies have addressed regulation of fluids after the initial resuscitation phase, antibiotic stewardship and interventions to mitigate cognitive, functional and physical effects of PICS, few studies have addressed a bundle of strategies to promote recovery from sepsis while still in the ICU (Dellinger et al, 2008; Balas et al, 2014; Marra, 2017; Ogbu, 2015; Prescott et al, 2019).

Post-Resuscitation Sepsis Order Set (PRSOs)

- Objective
 - The goal of this study was to determine if timely implementation of a post-resuscitation sepsis order set (PRSOs) resulted in a decrease in hospital length of stay (LOS) and hospital cost.

Major Elements of the Post-Resuscitation Order Set (PRSOs)

Antibiotics	Fluids	Mobility	Nutrition	Discharge Planning
•Deescalation of antibiotic regimen (narrowing or complete cessation)	•Deescalation of total fluid resuscitation to less than 40 ml/hour	•Nurse-initiated order for PT/OT evaluation to encourage early mobility	•Nursing-initiated order for nutrition consult with goal of advancing diet	•Nursing-initiated order of care coordinator consult to accelerate discharge planning

Post-Resuscitation Sepsis Order Set (PRSOs)

- Methods

- Study Design

- Retrospective electronic health record (EHR) data was collected during March 2017 through October 2017.
 - The PRSOs is an innovative nursing-initiated sepsis bundle developed by a multidisciplinary team and implemented in March 2017.
 - After development of the PRSO, education and training for nursing and clinicians was conducted via in-class room education and online modules.

Post-Resuscitation Sepsis Order Set (PRSOs)

- Methods (cont)

- Sample Selection

- The study sample included ICU patients who were:
 - (a) age 18 or older,
 - (b) had a DRG of 870 (Septicemia or Severe Sepsis with mechanical ventilation > 96 Hours), 871 (Septicemia or Severe Sepsis without mechanical ventilation > 96 Hours with Major Complication or Comorbidity) or 872 (Septicemia or Severe Sepsis without mechanical ventilation > 96 Hours without Major Complication or Comorbidity),
 - (c) admitted to the ICU and
 - (d) had an ICU stay of at least 24-hours.

Post-Resuscitation Sepsis Order Set (PRSOs)

- Methods (cont)

Intervention

- The PRSOs was implemented once certain parameters were met which was assessed for every 12-hour shift and consisted of:
 - No vasoactive medications for at least 2 hours
 - Completed at least 12 hours of standard ICU protocol for treatment of severe sepsis
 - Most recent lactic acid level within normal limits, or decreased from previous value
- The PRSOs was piloted from March 2017 through October 2017 in the ICU.

Post-Resuscitation Sepsis Order Set (PRSOs)

- Methods (cont)

Outcome

- For this study two patient outcomes were examined; hospital LOS and total cost of care.
- The outcomes compared were between patients who received the PRSOs and those who did not receive the PRSO during this time period.
- T-test was used for analysis utilizing SPSS Statistics for Windows, version 20 (SPSS Inc., Armonk, N.Y.)

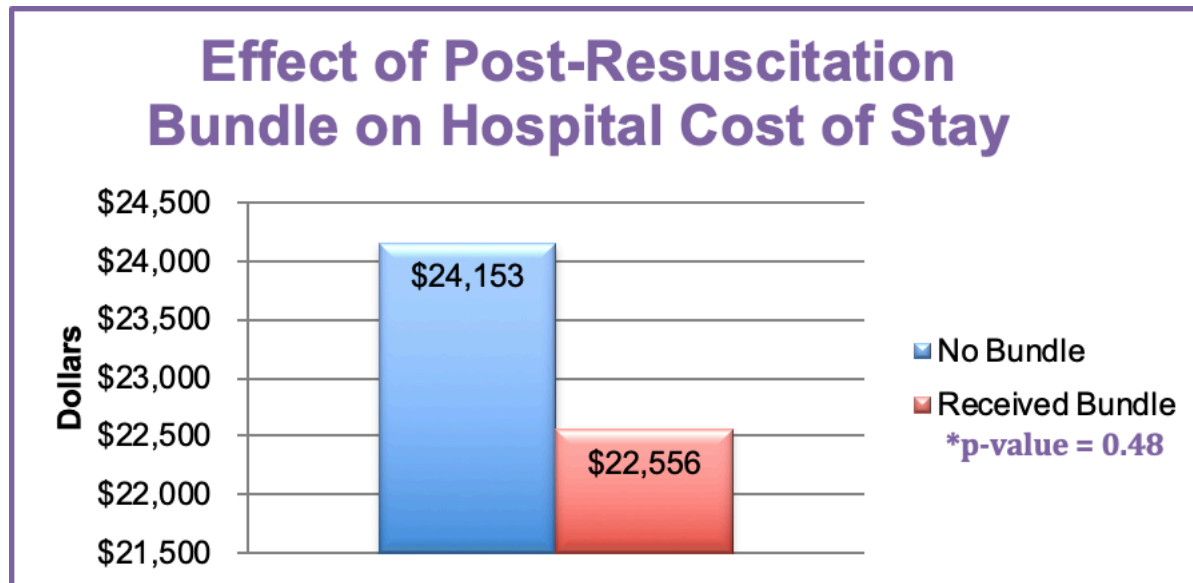
Post-Resuscitation Sepsis Order Set (PRSOs)

- Results
 - 749 consecutive patients were included in the analysis.
 - Of these 749 patients, 494 (65%) received the post-resuscitative bundle, and 255 (35%) did not.
 - Though not statistically significant, those who received the PRSOs had a decreased hospital length of stay (LOS) by more than one day (9.29 versus 10.33 days) and a decrease in hospital costs (\$22,566.54 versus \$24,155.98)

Post-Resuscitation Sepsis Order Set (PRSOs)

- Results

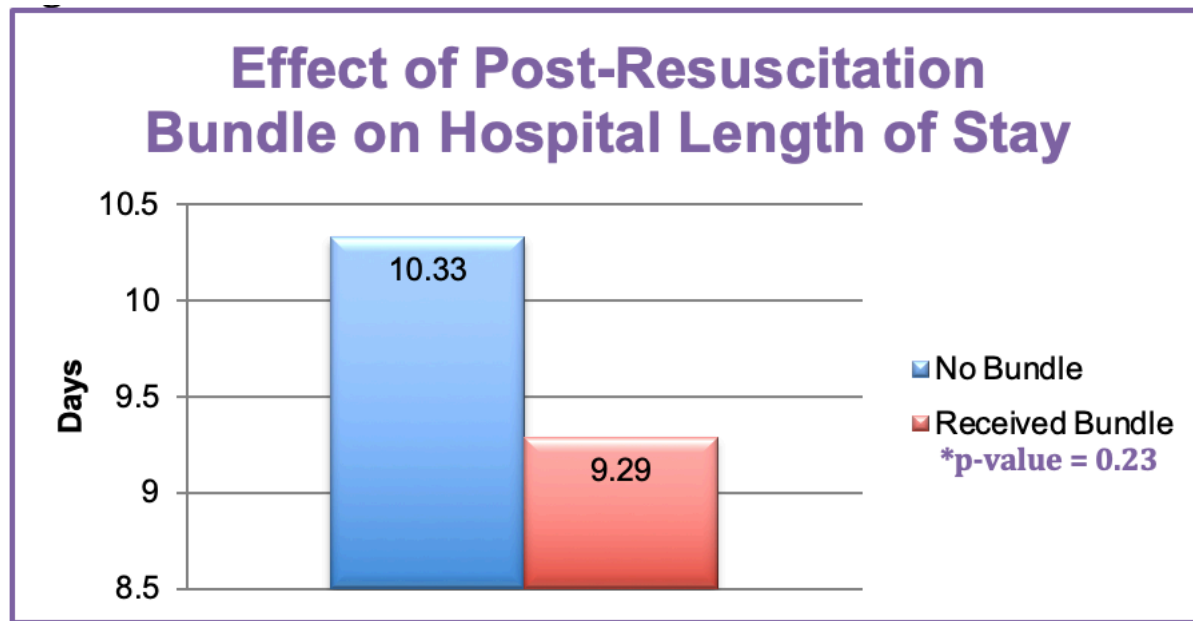
Figure 1.



Post-Resuscitation Sepsis Order Set (PRSOs)

- Results

Figure 2.



Post-Resuscitation Sepsis Order Set (PRSOs)

- Discussion
 - This feasibility study utilizing retrospective data, is the first to describe the effect of a novel nurse initiated PSROs on hospital length of stay and hospital cost.
 - We examined the implementation of a PSROs aimed at promoting sepsis recovery, on ICU patients demonstrating the parameters for PSROs implementation (discussed in Intervention)
 - The results of this small descriptive study showed a decrease in hospital length of stay and hospital costs, although not statistically significant, the preliminary results are reassuring and further study is warranted given the potential implications for future use.

Post-Resuscitation Sepsis Order Set (PRSOs)

- Discussion (cont)
 - In analyzing the data for the study, there are several factors as to why the total cost of care and hospital length of stay were decreased in a non-statistically significant way for patients who received the bundle.
 - The most important factor being that our data set was limited to one hospital and not large enough to lead to statistical significance.
 - Other factors include the study time frame taking place during the initial implementation of such a new, novel concept. And the prospects that its implementation was not always immediate during the transition
 - Since total cost of care and hospital length of stay are interconnected, even a non-statistically significant decrease is promising, and may become statistically significant in future studies with larger data sets.

Post-Resuscitation Sepsis Order Set (PRSOs)

- Discussion (cont)
 - In future studies, it may be beneficial to analyze how other post-resuscitative components of the PRSOs such as early nutritional intervention and early mobility has on long-term recovery of sepsis patients.
 - Other implications for future use could be looking at readmission rates within 30 days, total cost of antibiotic therapy during admission, CHF exacerbations and functional outcomes are all possible measures to be analyzed using the PRSOs.

Post-Resuscitation Sepsis Order Set (PRSOs)

- Conclusions
 - Although sepsis is a full-spectrum cause of organ dysfunction in acutely ill patients (Prescott, 2019), there are many opportunities for early intervention in the recovery phase that could ensure favorable long-term outcomes for patients. Therefore, there is merit in further exploring the potentially positive applications of a PRSOs in patients with severe sepsis at other facilities and on a larger scale in order to further quantify potential benefits of early recovery.

Thank You