INTRODUCTION

- Early recognition of patients with sepsis induced tissue hypoperfusion (SITH) remains a clinical challenge.
- Non-Invasive tissue oxygenation saturation (StO₂) monitors have been developed to provide a rapid, low-cost, and non-invasive bedside assessment of tissue oxygenation extraction.
- Use of StO₂ monitors has not been well validated as an initial screening tool for sepsis in the ED.

OBJECTIVES

- To assess the efficacy of initial bedside StO₂ readings in the early identification of patients with SITH and to compare StO₂ readings with lactate levels.
- We hypothesize that patients with significantly abnormal StO₂ readings will have a higher sepsis mortality and higher lactate levels.

METHODS

- We performed an IRB-approved, prospective, observational pilot study of a convenience sample of ED patients presenting with a sepsis continuum diagnosis.
- The study was conducted at an urban, tertiary care center with 90,000 visits per year.
- A portable In-Spectra ‘Spot Check’ StO₂ monitor was used to take a StO₂ reading at the thenar eminence.
- We defined an abnormal StO₂ as <80% or >91% based on consultations with the device manufacturer.
- Sensitivity/Specificity, Likelihood ratios, and NPV/PPV were calculated with 95% confidence intervals where appropriate.
- Inclusion: Patients with a suspected new infection confirmed by the attending physician and at least 2 SIRS (systemic inflammatory response syndrome) criteria.
- Exclusion: Patients <18 years of age or patients with no suspicion of infection.

RESULTS

Enrollment Statistics

79 patients enrolled
-Mean Age: 63 (21-96)
61 patients were admitted

Lactate vs. Abnormal StO₂

16/20 (80%) with Lactate >2.3 had an abnormal StO₂
7/8 (88%) with Lactate >3.0 had an abnormal StO₂
3/3 (100%) with Lactate >4.0 had an abnormal StO₂

ICU Admissions, Mortality, and MAP vs. Abnormal StO₂

5/5 (100%) admitted to the ICU had an StO₂ <74%
3/3 (100%) of mortalities had an StO₂ <72%
3/3 (100%) with a MAP < 70 had an StO₂ < 70%

CONCLUSIONS

- There was a strong correlation between poor patient outcomes and abnormal StO₂ levels as well as a strong correlation between high lactate levels and abnormal StO₂ levels.
- StO₂ may be a useful, rapid, low cost, and non-invasive bedside screening tool for SITH in the ED.
- StO₂ is particularly effective with severely ill patients.
- A reliable bedside tissue oxygenation monitor will allow physicians and nurses to provide sepsis treatment closer to time zero.
- Further studies are needed to determine StO₂’s ability to predict mortality and assess response to therapy.
- We will be looking at a subset of severe sepsis/septic shock patients using a constant monitoring StO₂ monitor.

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