

Relationship between Initial lactate and the need of ICU-Specific Interventions in Patients with Suspected Infection presenting to the Emergency Department

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Background:

Elevated serum lactate has been shown to be a predictor of mortality in septic populations. To date, however, the relationship between serum lactate and requirement for Intensive Care Unit (ICU)-Specific interventions has not been explored. As need for ICU-Specific intervention is a more proximal and actionable endpoint than all-cause mortality, understanding its relationship to lactate may be useful in assigning patient disposition from the ED. In the present study we sought to better characterize the relationship between initial ED lactate and need for ICU-Specific intervention amongst patients with suspected infection.

Methods:

We performed a retrospective chart review of all patients with a suspected infection presenting to the ED of a single urban tertiary care center between January 2010 to December 2014. Suspected infection was defined as receiving antibiotics and having a culture drawn within 24 hours of ED presentation, consistent with criteria used in the derivation of the Sepsis III definition. ICU interventions were defined as needing intravenous insulin, a central venous catheter, arterial catheter, urgent hemodialysis, pulmonary artery catheterization, intubation, non-invasive ventilation, and/or vasopressors. We excluded those with missing lactate values. The sensitivity and specificity of lactate >4 for predicting need for ICU-intervention were calculated.

Results:

Out of the 20,092 patients who met criteria for suspected infection, 48.3% were female and the mean age was 63.8 ± 17.9 . Of the sample, 990 (4.9%) had an initial lactate >4 and 4,309 (21.5%) required an ICU-Specific intervention. Patients with a lactate >4 had 8 times higher odds of needing an ICU-Specific intervention than those with a lactate ≤ 4 (OR: 8.0 [95% CI: 6.9-9.1]). A lactate > 4 had 15% sensitivity, 98% specificity, 65% positive predictive value, and 81% negative predictive value for requiring an ICU-Specific intervention.

Conclusions:

In a population of patients with suspected infection, a lactate >4 was highly specific in predicting need for ICU level care, therefore suggesting the majority of these patients should be admitted to the ICU. This is the first study to use "ICU-Specific intervention" as an endpoint for prediction, which we believe to be a more practical end-point as compared to the traditionally used "all-cause mortality."