

Point-of-Care Lactate Testing as a Predictor of Mortality in a Heterogeneous Emergency Department Population

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Background: Point-of-care (POC) lactate testing has been shown to correlate with serum measurements of lactate. In certain disease states, early lactate measurement is recommended.

Objective: To demonstrate that addition of POC lactate testing predicts mortality better than traditional clinical and laboratory markers.

Methods: This was a post-hoc analysis of a data set from a prospective, double-blind cohort study involving a convenience sample of heterogeneous patients presenting to an urban emergency department (ED). Patients presenting in cardiac arrest were excluded. POC lactate level ≥ 4 mmol/L (POC4) was compared with several clinical and biological values. Using descriptive statistics, we analyzed the impact of systemic inflammatory response syndrome (SIRS) criteria and POC4 on mortality rates. Logistic regression for mortality analysis was performed on POC4, systolic blood pressure, shock index, anion gap, base excess, and serum bicarbonate concentration. A composite score (the lactate-SIRS product, or LSP) involving the cross-product of the number of SIRS criteria (#SIRS) and POC was calculated. Likelihood ratios for in-hospital mortality were also calculated for #SIRS, LSP (R8), and POC4.

Results: Data were collected from 116 patients. Mortality for the entire population was 15%. POC < 4 mmol/L mortality was 7.1% and POC4 mortality was 36.7%. Patients with 3 and 4 SIRS criteria had mortality rates of 16% and 33.3%, respectively. With the addition of POC4 to 3 and 4 SIRS criteria, mortality increased to 33.3% and 100%. Logistic regression demonstrated the POC4 to be the only variable to predict mortality independently ($p = 0.049$). Calculated positive likelihood ratios (LRs) for ≥ 2 SIRS criteria, LSP, and POC4 were 1.2, 2.25, and 3.3, respectively.

Conclusions: POC lactate testing is more useful than other clinical or laboratory results for predicting death in a heterogeneous ED population. POC lactate added to SIRS criteria defines a population with a greater mortality than SIRS criteria alone.