

DISCORDANCE BETWEEN LACTATE AND BASE DEFICIT IN THE SURGICAL ICU: WHICH ONE DO YOU TRUST?

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Purpose: Both lactate and base deficit (BD) are utilized as predictors of injury severity and mortality. We examined the significance of these measures when used in combination, and particularly when they provide conflicting data.

Methods: Review of all ICU patients with simultaneously obtained lactate and BD. The ability to predict mortality and hospital stay was compared alone, in combination, and when there was disagreement between the measures. Receiver operating characteristic curves (ROC) were generated to compare predictive abilities.

Results: There were 1298 patients with 12,197 sets of paired lab data; 1026 trauma patients and 272 surgical patients. Lactic acidosis was present in 41% and a significant BD (>2) was found in 52%. Nonsurvivors had higher admission lactate (6.2 vs 3.2) and base deficit (6.1 vs 3.2) levels than survivors (both $p<0.01$), with a modest correlation ($r=0.52$) between the measures. The admission lactate and BD had similar predictive ability for mortality, with areas under the ROC of 0.7 and 0.66 respectively (both $p<0.01$). However, the predictive ability of the BD decreased significantly during the ICU stay (area=0.5) compared to lactate (area=0.68). Lactate and BD disagreed in 44% of all lab sets. In patients with a normal lactate (<2.2), the BD had no predictive ability for mortality (area=0.46, $p=ns$). However, in patients with a normal BD (<2.0), the lactate level retained its predictive ability for mortality (area=0.67, $p<0.01$). Lengths of stay were longer among patients with an elevated lactate, even when the BD was normal. There was no improvement in predictive ability using a combination of the two measures.

Conclusions: Both Lactate and BD may be used to identify lactic acidosis and predict mortality at admission. Elevated lactate predicts mortality and a prolonged hospital course regardless of the associated BD, while an elevated BD has no predictive value if the lactate level is normal.