at pragmatically arranged visits instead of standardize weekly follow-ups. We thus cannot rule out that unintended selection bias occurred. A larger con

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References

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Understanding Hyperlactatemia in Sepsis: Are We There Yet?

To the Editor:
High plasma lactate is a useful indicator of shock, a canary in the coal mine, that is associated with increased mortality in sepsis.

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However, instead of being a harmful molecule per se, lactate is a central molecule in the intra- and interorgan exchange of carbon and redox potential (1). The study byGattinoni and colleagues, who used a novel approach to analyze data from the ALBIOS (Volume Replacement with Albumin in Severe Sepsis) study, adds to the required change of paradigm concerning lactate metabolism in sepsis (2). The authors nicely demonstrate that there are multiple reasons for hyperlactatemia in sepsis, and that the increased snapshot value we measure reflects an imbalance between increased production and reduced consumption.

By introducing the term “alactic base excess,” the authors also elegantly demonstrate that there is no causal relationship between elevated lactate and metabolic acidosis. We would add that, in fact, lactic acidosis per se is a misnomer, a construct that doesn’t exist, because there is no lactic acid present in the human body (3).

Similarly, we agree that current fluid resuscitation strategies should be modified and perhaps concentrate on organ perfusion rather than targeting hyperlactatemia (4).

We would, however, question the conclusion that impaired tissue oxygen use is the most likely causative factor for hyperlactatemia. Although we are unable to perform correlations without access to the raw data, if we chart the means shown in Table E2 in the online supplement of Reference 2, there seems to be a relationship between lactate levels and epinephrine dose but not between lactate and any variable related to oxygen use (oxygen extraction ratio, VO2, or central venous oxygen saturation). Therefore, we would suggest that exogenous (and likely endogenous) epinephrine via its stimulation of Na+–K+ ATPase and glycolysis is likely responsible for the hyperlactatemia in sepsis, rather than impaired tissue oxygen use (5).

The possible association of a change in the mean lactate value with the mean P*O2 gap, from Table E2 in the online supplement of Reference 2, also raises the possibility that increased (not decreased) Krebs cycle activity is associated with hyperlactatemia. Epinephrine-associated hyperlactatemia has also been observed in a prospective randomized trial in septic shock (6).

References