Capillary refill time vs serum lactate measurement in septic shock patients: Which is better in Emergency department?

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ABSTRACT

Clinical Question: Does the use of a resuscitation strategy that targets normalization of capillary refill time compared with a strategy that targets serum lactate levels reduce mortality among patients in septic shock?

Article Chosen: Glenn Hernández, Gustavo A. Ospina-Tascón, Lucas Petri Damiani et al. Effect of a Resuscitation Strategy Targeting Peripheral Perfusion Status vs Serum Lactate Levels on 28 Day Mortality Among Patients with Septic Shock. The ANDROMEDA-SHOCK Randomized Clinical Trial. JAMA. 2019;321(7):654-664.[1]

Objective: The study's objective was to determine if a resuscitation strategy guided by peripheral perfusion using capillary refill time was superior to lactate-guided resuscitation among adults admitted to the intensive care unit with early septic shock.

Conclusion: Assessing capillary refill time is an age-old easy manner to assess tissue perfusion. It is more applicable to our settings where lactate measurement may not be available in all health centres and assessing capillary refill time can guide us in resuscitation and reduce mortality together with or without serum lactate measurement.

Keywords: capillary refill time, septic shock, serum lactate

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BACKGROUND

Adherence to sepsis guidelines and bundles have contributed to improving the quality of care and reducing mortality in patients with sepsis.[1,2] The 2018 guideline update highlighted the importance of measuring serum lactate early, in order to guide ongoing resuscitation, in addition to obtaining blood cultures, administering broad spectrum antibiotics, and initiating fluids and vasopressors if needed.[1]

Although normalization of serum lactate levels have been associated with improved prognosis, serum lactate remains an imperfect surrogate marker of perfusion, and is not a direct measure of tissue perfusion or oxygenation. Serum lactate levels take time to process, and lag behind the patient's actual tissue perfusion. Clinical conditions other than shock can lead to increased lactate levels such as liver failure that can confound the clinical picture. Its use is thus based only on low quality evidence.[2,3] Finally, the test may not be available in all settings, including in remote or resource-poor settings such as the one we work in.

An alternative marker or physical examination finding is assessment of capillary refill time which guides resuscitation that more closely reflects the patients' status and helps in improving patient care, irrespective of our practice settings. CRT is more accessible, cheap and any health professional can perform it.

In early resuscitation, lactate decreases simultaneously with normalization of peripheral perfusion. Hence, resuscitation based only on correcting hyperlactatemia will not be adequate. Normalization of peripheral perfusion would be more appropriate, as this would decrease serum lactate simultaneously. Capillary refill time can be used to measure peripheral perfusion, and can be rapidly performed at bedside by any health personnel.

Lara et al., determined the prevalence of an abnormal capillary refill time in patients with sepsis-related hyperlactatemia in the early phase after Emergency department admission, and its outcome.[4] They concluded that septic patients who had elevated serum lactate levels and abnormal capillary refill time after initial fluid resuscitation had higher mortality and poorer clinical outcomes in comparison to patients with normal capillary refilltimes.[4]

POPULATION STUDIED

The study included adults with septic shock who were admitted to a participating intensive care between March 2017 and March 2018. Patients with bleeding, severe acute respiratory distress syndrome, and do-not-resuscitate orders were excluded.

STUDY DESIGN

This study was a multi-center randomized clinical trial conducted in 28 hospitals in 5 South American countries.

OUTCOMES

The primary outcome was all-cause mortality at 28 days. Secondary outcomes included death at 90 days, organ dysfunction within 72 hours, mechanical ventilation–free days within 28 days; renal replacement therapy–free days within 28 days; vasopressor- free days within 28 days; and intensive care unit and hospital lengths of stay.

RESULT

A total of 424 patients were enrolled in the study, with 212 assigned to each group. In the intervention group, resuscitation was guided by standardized capillary refill time assessments as measure of peripheral perfusion. In the control group, resuscitation was guided by measurement of serial serum lactate. No patients lost to follow up.

In the intention-to-treat analysis, 34.9% died at 28 days in the peripheral perfusion group, compared to 43.4% in the lactate group, resulting in an absolute risk difference of −8.5% favoring the peripheral perfusion group (95% confidence interval [CI] −18.2% to 1.2%). The adjusted hazard ratio of dying at 28 days was 0.75 (95% CI 0.55 to 1.02; p = .06) indicating no statistically significant differences between groups. The secondary outcomes were consistent with the same trend as the primary outcome, favoring the peripheral perfusion group. There was less organ dysfunction at 72 hours in the intervention group (mean difference in sequential organ failure assessment scores −1.00 (95% CI, −1.97 to −0.02]; P = .045). Patients in the peripheral perfusion group received less resuscitation fluids in the first 8 hours compared to lactate level targeted resuscitation (mean difference, −408 mL [95% CI, −705 to −110]; P = .01) .

CRITICAL THINKING

Though this study concluded that a peripheral perfusion targeted resuscitation strategy did not reduce all-cause 28-day mortality in patients with septic shock compared to serum lactate targeted resuscitation, there was an impressive clinically-significant 8.5% absolute risk reduction in 28-day mortality in patients resuscitated by with using capillary refill time.

Although the use of capillary refill time can have inter-observer variability, it is a measure of tissue perfusion, and can be performed quickly independent of the availability of a laboratory, and can immediately direct resuscitation decisions. In the context of resource-limited settings, capillary refill time can have vital role in guiding resuscitation

in septic shock patients, and may contribute to reducing mortality.

CONCLUSION

Assessing capillary refill time is an age-old easy manner to assess tissue perfusion. It is more applicable to our settings where lactate measurement may not be available in all health centers and assessing capillary refill time can guide us in resuscitation and reduce mortality together with or without serum lactate measurement.

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