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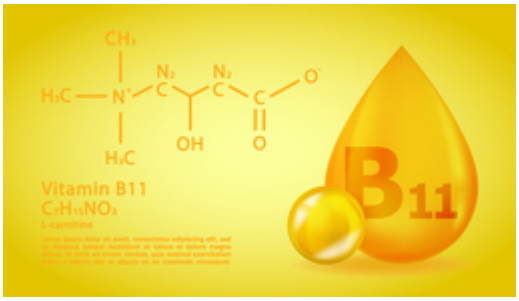
Acetylcarnitine (C2) as a Biomarker for a Mortality Benefit from Supplemental L-carnitine in Patients with Septic Shock

TECHNOLOGY NUMBER: 2020-390



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Category
Diagnostics
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OVERVIEW

Predictive biomarker for mortality benefit from L-carnitine treatment for septic shock

- A 31% absolute benefit in 90-day survival for appropriate patients treated with L-carnitine
- Those with lower acetylcarnitine levels got no benefit and should be treated with a different approach

BACKGROUND

Sepsis is a clinical condition that occurs during an overwhelming infection and which causes a cascade of physiologic abnormalities including hyperlactatemia, hyperglycemia, lipolysis, and protein catabolism. The resulting inflammatory response can lead to septic shock, which portends a very poor prognosis with short-term mortality occurring in 40% of affected patients. In practice, sepsis remains the leading cause of death for patients in intensive care units. Several supportive interventions and treatments can be offered for patients suffering sepsis or septic shock, though the outcomes are often suboptimal. One treatment approach involves the delivery of L-carnitine with the goal of restoring metabolic balance. The results of studies evaluating the efficacy of L-carnitine in this setting have shown conflicting results. Though one recent trial did not show a significant reduction in mortality of sepsis patients after treatment with L-carnitine, there is a need to further evaluate subpopulations of the study group to determine whether there are categories of patients who might benefit from this approach.

INNOVATION

Researchers utilized a preplanned secondary analysis of serum samples from a clinical trial of sepsis patients to show that acetylcarnitine is the most viable candidate to predict a mortality benefit from the use of L-carnitine. Sepsis patients with acetylcarnitine levels >36 micromoles were less likely to die at 90 days if treated with L-carnitine. The results were statistically significant and revealed an improvement in survival from 69% to 100%. Conversely, sepsis patients acetylcarnitine levels <36 micromoles showed no benefit with L-carnitine treatment. The use of pretreatment acetylcarnitine concentration represents a clinical trial enrichment strategy that could be employed for a phase III L-carnitine efficacy study in patients with septic shock.

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