There is no justification in the otherwise excellent editorial for the relegation of thiamine to a trivial part in the story. Given the limitations of the experimental design no one part of the package can be considered more important than any other. For these reasons I believe thiamine also deserves a cautious but fair chance in severe sepsis.

Matt Thomas, MBChB
Bristol, UK

AFFILIATIONS: From Intensive Care Medicine, North Bristol NHS Trust, Southmead Hospital, Bristol, England.

FINANCIAL/NONFINANCIAL DISCLOSURES: None declared.

CORRESPONDENCE TO: Matt Thomas, MBChB, Intensive Care Medicine, North Bristol NHS Trust, Southmead Hospital, Southmead Rd, Westbury-on-Trym, Bristol BS10 5SN, England; e-mail: matt.thomas@nbt.nhs.uk

Copyright © 2017 American College of Chest Physicians. Published by Elsevier Inc. All rights reserved.

DOI: http://dx.doi.org/10.1016/j.chest.2017.06.044

References

Response

To the Editor:

We sincerely appreciate the comment by Dr Thomas concerning our editorial on the before-after study by Marik and coworkers using hydrocortisone, vitamin C, and thiamine in severe sepsis (both in CHEST). Use of this cocktail was associated with an impressive reduction in organ failure and mortality. Yet, effectiveness remains to be proven in a randomized design. In our editorial, we specifically highlighted the beneficial effects of vitamin C, but fully agree with Thomas that the relative contribution of the ingredients in the cocktail currently remains unknown and that thiamine may intrinsically contribute to the metabolic resuscitation in sepsis.

Thiamine is crucial for mitochondrial energy production because of its key role in the gatekeeping and completion of the Krebs cycle and the so-called pentose phosphate pathway, which produces NADPH for biosynthetic pathways and ribose 5-phosphate, a precursor of nucleotides. Furthermore, by maintaining NADPH thiamine protects against oxidative damage. Its postulated role in reducing oxalate excretion was the one highlighted in the study by Marik and coworkers.

Thiamine deficiency may occur in about one-third of septic patients and is elicited by the overwhelming need for it during the hypermetabolic response in sepsis. Premorbid (subclinical) deficiency likely augments the sepsis-induced thiamine depletion and may be due to reduced intake, impaired absorption, or increased urinary loss. Deficiency leads to energy depletion in cells and may thereby contribute to cytopathic mitochondrial failure. Clinically, thiamine deficiency is associated with dysfunction of vital organs such as heart and brain (high-output cardiac failure and Wernicke’s encephalopathy), and with lactate acidosis because pyruvate does not enter the Krebs cycle.

Thiamine supplementation reduced lactate levels and mortality in septic shock in the subset of patients with deficiency. Interestingly, and as highlighted by Thomas, thiamine may specifically mitigate septic renal dysfunction. Tubular cells have an extremely high metabolic rate. If thiamine is deficient, ATP depletion may contribute to tubular dysfunction while low NADPH may hamper antioxidant protection. The supply of high-dose thiamine in the early phase of sepsis may thus treat pending deficiency, and maintain energy production and the cellular redox state.

In short, we fully support the statements by Thomas that thiamine supplementation may intrinsically contribute to the beneficial effect of the hydrocortisone, vitamin C, and thiamine cocktail in sepsis. The effectiveness of each of the components should be the subject of equally expeditious and rigorous study, as is the true effectiveness of the combination itself.

Heleen M. Oudemans-van Straaten, MD, PhD
Paul W. G. Elbers, MD, PhD
Angélique M. E. Spoelstra-de Man, MD, PhD
Amsterdam, The Netherlands

AFFILIATIONS: From the Department of Intensive Care, VU University Medical Centre.
Point-of-Care Ultrasonography for Acute Coronary Syndrome

Rule This in or Rule Out Others?

To the Editor:

I read with interest the study focused on point-of-care ultrasonography (PoCUS) to evaluate the cause of acute dyspnea in the ED by Zanobetti et al. in a recent issue of CHEST (June 2017). The authors demonstrated good diagnostic concordance between the PoCUS diagnosis and the ED diagnosis, with a significantly shorter diagnostic time in favor of PoCUS. Furthermore, they found that PoCUS diagnosis was very specific for acute coronary syndrome. Unlike other specific diseases listed in Table 2 of their paper, the authors did not mention the PoCUS criteria for diagnosing acute coronary syndrome.

The echocardiographic assessment in this study included qualitative evaluation of left ventricular systolic function and detection of the presence of right ventricular dilatation and pericardial effusion. Using PoCUS or, more specifically point-of-care echocardiography, to diagnose acute coronary syndrome requires identifying asynergy of left ventricular wall motion, which was not a routine assessment in this study. Therefore, the high specificity of PoCUS for the diagnosis of acute coronary syndrome may result from excluding other specific PoCUS patterns combined with compatible information obtained during primary assessment (mainly electrocardiographic changes), as in the case of COPD/asthma, rather than detecting the confirmatory PoCUS findings for acute coronary syndrome.

In addition, analysis of left ventricular segmental wall motion is beyond the scope of focused cardiac ultrasonography in the emergency setting, as described in the consensus statement by the American Society of Echocardiography and the American College of Emergency Physicians. Incorporating this assessment into PoCUS for evaluation of acute dyspnea in the ED may reduce its generalizability.

Li-Ta Keng, MD
Hsinchu City, Taiwan

References