

Zinc and copper levels in severe heart failure and the effects of atrial fibrillation on the zinc and copper status.

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Abstract

Oxidative stress is involved in the pathogenesis of congestive heart failure (CHF). Some trace elements serve as antioxidant defenses. The purpose of this study was to analyze the effect of atrial fibrillation (AF) on zinc (Zn) and copper (Cu) levels in patients with advanced CHF. In this prospective study, serum Zn and Cu levels in 78 patients with clinically advanced CHF, i.e., New York Heart Association (NYHA) functional class III or IV (40 patients with AF and 38 in sinus rhythm) were measured using atomic absorption spectrophotometry. All patients also had a left ventricular ejection fraction (EF) of <35%. We recruited 40 volunteers with nearly the same age and weight as control. They had normal EF. There was no significant difference between patients with AF and those with sinus rhythm regarding serum Zn and Cu levels. However, both groups showed significant hypozincemia ($p < 0.000$) and a decreased Zn/Cu ratio ($p < 0.03$) compared with control group. Serum Cu levels were similar in the two groups and did not differ significantly from the control group. In patients with advanced CHF, irrespective of the rhythm, profound hypozincemia, and a decreased Zn/Cu ratio were present, which could be secondary to the activation of the renin-angiotensin-aldosterone system and CHF medications. The results suggest the need for more studies focusing on possible benefits with Zn nutraceutical replacement in patients with advanced CHF.



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