

3rd Immunonutrition Workshop, 21–24 October 2009, Girona, Spain

Zn²⁺-deficiency in critically ill patients with SIRS is linked to Mg and oxidative status

E. Planells¹, D. Florea¹, M. García-Ávila¹, E. Millán¹, L. Sáez¹, M. Rodríguez-Elvira², B. Quintero³, C. Soler⁴, C. Cabeza³, F. Gonzalez-Diaz, González-Martín, and P. Aranda¹

¹Physiology, University of Granada, Spain, ²icu & ndu, Hvn. Sas. Spain, ³Physico-Chemistry, University of Granada, Spain and ⁴Consejería De Educación, Granada, Spain

Zn deficiency and Mg deficiency are linked to inflammatory and immune processes mediated by reactive oxygen species that are increased in those lacking circumstances. Measurement and monitoring of Zn²⁺ are important to prevent the development of serious and potentially fatal complications in critically ill patients. The aim of this study was to define the status of Zn²⁺ at admission and 7 days of ICU stay in critically ill patients and to evaluate its relationship with Mg²⁺ and Cu²⁺ in plasma and erythrocyte, and with oxidative status.

A prospective study was done on 38 critically ill consecutive patients with inclusion criteria: ≥ 18 years old, APACHE II > 15 and SIRS diagnostic. Zn²⁺, Cu²⁺ and Mg²⁺ were measured by flame atomic absorption spectrophotometry (AAS) in wet-mineralised samples of plasma and erythrocyte. Mg, Zn and Cu content in administered nutrition was recorded daily during the 7 days of studied stay, and % RDIs were obtained. SOD activity was measured by spectrophotometry with an enzymatic method in erythrocyte. TNF-β, IL-1, IL-6 and IL-10 were analysed by colorimetric methods.

At admission 36.5, 30.3 and 30.6% of patients were deficient in erythrocyte Zn, Cu and Mg, respectively, increasing to 49, 46 and 41.2% at seventh day of ICU stay. There was significant differences between initial and final levels in plasma and erythrocyte ($P < 0.05$, in three elements). A significant correlation was found between Zn administered by nutritional (PE and/or E) treatment (94% below RDIs) and erythrocyte Zn content ($P < 0.05$) at seventh day, and erythrocyte Zn level is positively associated with erythrocyte Mg level content, TNF-β, IL-6 ($P < 0.02$) and SOD activity ($P < 0.05$) of critically ill patients.

Monitoring of Zn status is needed in critical care patients. Adequate intake of Zn, and Zn levels in plasma and erythrocyte is needed to be controlled at admission and during ICU stay of patients and may have prognostic, and perhaps therapeutic, implications. Development of Zn deficiency during an ICU stay may be associated with different metabolic, immune and clinical alterations that are attributed to other causes or are unknown, but complicate evolution of critically ill patient.

I declare that I do not have any affiliation with or financial interest in a commercial organisation that poses a conflict of interest.