Evaluating the relationship between Zinc and Thiamine plasma concentrations with SAPSII in ICU admitted poisoned patients

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Abstract: Acute drug and chemical poisoning is the leading cause of mortality in the intensive care unit so finding the prognostic biomarkers for morbidity and mortality can support critically ill patients and reduce the cost of health management. We explored the hypothesis whether there is relationship between plasma zinc concentration and plasma Thiamine concentration with SAPSII (Simplified Acute Physiology Score), higher chances of mortality as well, in patients with acute poisoning.

We conducted a prospective case-control study in the intensive care Unit of Loghman Hospital Which Involves 30 patients with acute poisoning .Patients randomly assigned and their blood samples were collected at ICU admission and ICU discharge. Demographic characteristic and laboratory data were recorded .we commuted SAPSII to predict the rate of mortality .The plasma levels of zinc were analyzed by differential pulse voltammetry at a hanging mercury drop electrode (HMDE) after plasma acid digestion .The total Thiamine of plasma measured by High-performance liquid chromatography fluorometrically by pre-column derivatization method.

Plasma Zinc deficiency was defined as less than 10.7 µmol/l. In this study group ,patients with SAPS II scores of 50 or higher had significantly lower plasma zinc level compared with patients with SAPSII scores lower than 50,(7.36 ±2.53 and 10.02±1.81 µmol/l respectively ;p<0.05). In addition, in patients with the score of SAPSII of 50 or higher has the statistically significantly lower concentration of thiamin than the control group. (12.72±1.36 and 29.67±1.63; p<0.05).Both zinc and Thiamine were statistically negative correlated with SapsII scores (r=-4.1, p=0.02 and r=0.51, p=0.04 respectively).

Our data suggest that critical illness lead to decline in plasma zinc and thiamine concentration and the linear relationship of SAPSII and zinc and Thiamine deficiency shows that zinc can be a prognostic utility to predict poisoning fatality and mortality.

Keyword: Critical care, Acute Poisening, Thiamine, Zinc, SAPSII, Mortality