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Assessment of zinc and copper levels in diabetes mellitus

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Statement of the Problem: The associations of serum zinc, copper and Zn/Cu ratio with clinical/biochemical characteristics in both types of diabetic patients were explored in this study.

Methodology & Theoretical Orientation: Serum levels of zinc and copper were measured by atomic absorption spectrophotometer in 26 type 1 and 80 type 2 diabetic patients, along with 205 age/gender-matched healthy controls.

Findings: Significantly decreased levels of Zn and Zn/Cu ratio were observed in both types of diabetic patients compared to controls, more clearly in type 1 ($p<0.001$). Positive and significant correlations between Zn and age ($r=0.460$, $p<0.001$), Zn and BMI ($r=0.344$, $p<0.001$), Zn/Cu and total cholesterol ($r=0.207$, $p=0.033$), and Zn and the number of coronary risk factors (Spearman's $r=0.311$, $p=0.001$) were found. No significant relationship between Zn, Cu and Zn/Cu ratios with other biochemical parameters including HbA1c and in terms of family history, smoking, medications, micro vascular and macrovascular complications was found in both types of diabetic patients.

Conclusion & Significance: Alterations of trace elements have been reported to have effects on the pathogenesis and progression of diabetes mellitus. Although decreased Zn/Cu ratio was found in our diabetic patients, no significant correlations were observed with clinical/biochemical characteristics except BMI, cholesterol, total cholesterol, and the number of coronary risk factors in our patients. Further studies may be the final arbiter of this issue.

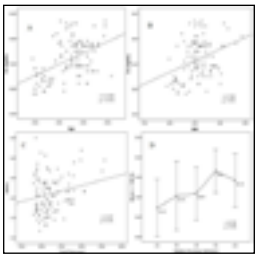

Figure 1: Relationships between Zn or Zn/Cu ratio with clinical parameters: A) age, B) BMI (body mass index), C) total cholesterol and, D) The number of coronary risk factors in all patients.

Recent Publications

1. Zhang H, Yan C, Yang Z, Zhang W, Niu Y, Li X, *et al.* (2017) Alterations of serum trace elements in patients with type 2 diabetes. Journal of Trace Elements in Medicine and Biology 40:91-6.
2. Luliano L (2011) Pathways of cholesterol oxidation via non-enzymatic mechanisms. Chemistry and Physics of Lipids 164:457-68.
3. Samatha P, Venkateswarlu M and Prabodh S (2011) Role of biochemical markers in the prediction of microvascular complications in type-2 diabetes mellitus. J Clin Diagn Res. 5:1154-7.
4. Kazi T G, Afridi H I, Kazi N, Jamali M K, Arain M B, Jalbani N, *et al.* (2008) Copper, chromium, manganese, iron, nickel, and zinc levels in biological samples of diabetes mellitus patients. Biological Trace Element Research 122:1-18.
5. Ibrahim A, Nasrat W and Elhefian E A (2017) Evaluation of biochemical parameters and trace elements in type-2 diabetic patients. Nova Journal of Medical and Biological Sciences 5(4).

Biography

Selen Yilmaz Isikhan carried out an integrated master and doctorate education in biostatistics department of Hacettepe University Faculty of Medicine. She has been working as a lecturer at the same university since 2010. Her research interests are biostatistics, data mining, multivariate statistical analysis, high-dimensional bioinformatics studies and microbiota studies.

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