

Elevated plasma copper/zinc ratios in patients with schizophrenia

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Abstract

Background&Objective: Copper and zinc, two essential trace elements, are neuroactive substances that can be synaptically released during neuronal activity. These metals have been implicated in diseases with neuropathological components, including Alzheimer's disease, Menkes disease, Wilson's disease, Pick's disease, stroke and seizures. Copper and zinc levels in body tissues reflect many physiological and pathological conditions, including dietary factors, hepatic disease, and acute and chronic infections. The purpose of the present study was to examine the plasma levels of copper (Cu) and zinc (Zn) in schizophrenic patients and to compare the Cu/Zn ratios with that of matched healthy subjects.

Materials&Methods: Forty patients with schizophrenia (diagnosis were made according to DSM-IV) were sampled along with 50 healthy controls. Exclusion criteria included another concurrent psychiatric disorder, pregnancy, and medical disorders (endocrine, immune, liver cirrhosis, renal) or drugs (anticonvulsants, contraceptives, glucocorticoids) known to affect trace element metabolism. Fasting blood samples were withdrawn from an antecubital vein between 07.00 and 09.00 h. Plasma copper and zinc levels were measured using an atomic absorption spectrophotometer (Perkin Elmer GmbH, Uebelingen, Germany). Two-tailed t test was used to determine statistical differences. All data were analyzed with the computer program, GRAPHPAD software (V2.01+).

Results: Mean \pm SE of sera copper levels in cases and controls were 145 \pm 28 and 65 \pm 3 μ g/dl respectively (P<0.05). Also Mean \pm SE of sera zinc level in cases and controls were 67 \pm 2 and 81 \pm 4 μ g/dl, respectively (P<0.05). Cu/Zn ratios was 2.07 \pm 0.38 and 0.87 \pm 0.04 in cases and controls respectively (P<0.05).

Conclusion: There was a significant higher Cu/Zn ratio in schizophrenic patients compared to healthy subjects. These results suggest that Cu and Zn may be involved in the pathophysiology of schizophrenia.

Key Words: Atomic absorption, Copper, Zinc, Schizophrenia