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Copper/zinc and Copper/Selenium Ratios, and Oxidative Stress as Biochemical Markers in Recurrent Aphthous Stomatitis

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Abstract

Project: Recurrent aphthous stomatitis (RAS) is a common oral mucosal disorder characterized by recurrent, painful oral aphthae, and oxidative stress presumably contributes to its pathogenesis. The aim of this study is to scrutinize the relationship between oxidative stress and serum trace elements (copper, Cu; zinc, Zn; selenium, Se), and to evaluate the ratios of Cu/Zn and Cu/Se in this disorder.

Procedure: Patients with RAS (n = 33) and age- and sex-matched healthy control subjects (n = 30) were enrolled in this study. Malondialdehyde (MDA) concentrations in plasma and the activities of superoxide dismutase (SOD1; CuZnSOD), glutathione peroxidase (GPx) and catalase (CAT) in erythrocyte were determined as spectrophotometric. Also, the levels of Se, Zn and Cu in serum were determined on flame and furnace atomic absorption spectrophotometer using Zeeman background correction.

Results and conclusions: Oxidative stress was confirmed by the significant elevation in plasma MDA, and by the significant decrease in CAT, SOD1, and GPx (p < 0.05). When compared to controls, Zn and Se levels were significantly lower in patients, whereas Cu levels was higher in RAS patients than those in controls (p < 0.05). In addition, the correlation results of this study were firstly shown that there were significant and positive correlations between Se-CAT, Se-GPx, and Cu-MDA parameters, but negative correlations between Se-Cu, Se-MDA, Cu-CAT, Cu-SOD1 and Cu-GPx parameters in RAS patients. Furthermore, the ratios of Cu/Zn and Cu/Se were significantly higher in the patients than the control subjects (p < 0.05). Our results indicated that lipid peroxidation associated with the imbalance of the trace elements seems to play a crucial role in the pathogenesis of RAS. Furthermore, the serum Cu/Zn and Cu/Se ratios may be used as biochemical markers in these patients.

Keywords: CAT; Cu; GPx; MDA; Oxidative stress biomarkers; RAS; ROS; Recurrent aphthous stomatitis; SOD; Se; Trace elements; Zn; catalase; copper; glutathione peroxidase; malondialdehyde; reactive oxygen species; recurrent aphthous stomatitis; selenium; superoxide dismutase; zinc.

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