

Abstract

Background: Oxidative stress (OS) has been implicated in pathogenesis of human disorders such as depressive disorder, sepsis, cardiovascular disease, acute and chronic pancreatitis, and cancer. Increased OS is result of imbalance between increased reactive oxygen and nitrogen species (RONS) production and / or insufficient activity of antioxidant defence system. Antioxidant system, which is composed of antioxidant enzymes such as superoxide dismutase, catalase, glutathione peroxidases (GPX), glutathione reductase (GR) and non-enzymatic antioxidant reduced glutathione (GSH) plays an important role in the protection of cells against enhanced OS. The aim of this study was to assess the OS markers and antioxidant enzymes in different pathophysiological states.

Materials and methods: Activities of erythrocyte glutathione peroxidase (GPX1), GR and concentration of GSH as well as levels of OS markers were analysed in six different pathophysiologic states. These parameters were measured in 35 women with depressive disorder (DD), 40 patients with metabolic syndrome (MetS), 30 septic patients (S) followed up in the course of sepsis; 15 non-septic critically ill patients (NC), 13 patients with acute pancreatitis (AP), 50 with chronic pancreatitis (CP) and 50 patients with pancreatic cancer (PC), compared to age- and sex-matched controls (CON). Activities of GPX1 and GR and levels of GSH were determined spectrophotometrically in erythrocytes.

Results: The erythrocyte activities of GPX1 has been found to be decreased in DD patients, AP, S as well as in CP and PC patients, whereas no significant differences in GPX1 activities were observed in MetS patients compared with CON. Moreover, in the course of AP GPX1 activities did not differ among individual samplings. In the contrast to GPX1 activity, higher GR activity has been observed in DD, MetS and S compared to CON and S in comparison with NC. Whereas GR activity was found unaffected in the course of sepsis and AP, the decrease in GR activity has been observed in CP and PC patients compared to CON. In all aforementioned pathophysiologic states the levels of GSH were decreased.

Conclusion: It has been shown that there are alterations in antioxidant enzymes and antioxidants in different pathophysiologic states. Deficiency of antioxidant defence system results in increased OS, which is implicated in the pathogenesis all above mentioned diseases.

Key words: oxidative stress, antioxidant enzymes, depressive disorder, metabolic syndrome, sepsis, acute and chronic pancreatitis, pancreatic cancer