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Increased Lipid Peroxidation and Decreased Antioxidant Response in Serum and Cerebrospinal Fluid in Acute Ischemic Stroke

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Abstract: Background and Aim: The pathogenesis of brain damage in ischemic stroke is highly complex. The aim of the present study was to investigate the presence of oxidative stress in ischemic stroke and to determine whether the measured oxidative stress markers in serum and cerebrospinal fluid (CSF) were associated with infarction volume, and the Glasgow Coma Scale (GCS) and Glasgow Outcome Scale (GOS). Materials and Methods: The study included 32 patients with acute ischemic stroke within 48 h of onset and 18 suitable controls. Superoxide dismutase (SOD) and glutathione peroxidase (GPX) activity, glutathione (GSH) and malondialdehyde (MDA) level, and total antioxidant capacity (TAC) were measured in both serum and CSF samples of the participants. Results: GPX activity, GSH level, and TAC in the serum and CSF samples of stroke patients were significantly lower than those in the controls. In the patient group, SOD activity in serum was lower and SOD activity in CSF was higher compared to the control group. Both serum and CSF MDA concentrations were significantly higher among stroke patients as compared to the controls. Conclusions: The lower activity levels of antioxidant molecules measured in this study could have resulted from increased free radical generation, which may confirm the presence of oxidative stress in acute ischemic stroke; however, the levels of oxidative stress markers in serum and CSF may not always be indicative of neurological deficit.

Key Words: Ischemic stroke, oxidative stress, cerebrospinal fluid, malondialdehyde, total antioxidant capacity

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