

Oxidative stress in migraine patients

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Oxidative stress is discussed to be implicated in the pathophysiology of migraine. However, data are in part controversial and the possible underlying mechanisms remain elusive to date.

There is strong evidence associating migraine with a variety of comorbid disorders, including cardiovascular disease and stroke, in which oxidative stress seems to be an important underlying mechanism. Migraine is characterized by multiple attacks of severe headaches often unilateral. The molecular mechanisms of migraine have not yet been clearly defined. Disorders of oxidant-antioxidant balance are observed in a number of acute and chronic diseases of the central nervous system. Oxidative stress is also believed to play a role in the pathogenesis of migraine.

A primary headache, particularly migraine, is associated with oxidative stress during the attack. However, data regarding the interictal state in migraineurs and in those with tension-type headache (TTH) is limited. Migraine is the most common neurological disorder, but the molecular basis is still not completely understood. An impairment of mitochondrial oxidative metabolism might play a role in the pathophysiology.

To the best of our knowledge, this is the first study investigating oxidant and antioxidant status of patients having migraine without aura (MWOA). The aim of the study was to investigate in migraineurs the body oxidant/antioxidant balance and paraoxonase enzyme activities as a measure of HDL functionality.

Oxidative stress index, total oxidant status and antioxidant status were examined in addition to the paraoxonase and arylesterase enzyme activities in sixty-two migraineurs and fifty healthy control subjects.

There were 56 patients (46 female, 10 male) in the migraine group and 25 matched healthy subjects in the control group. The patients comprised 37 with migraine without aura (MWOA), 19 with migraine with aura (MWA), and 22 with headache attack. The MDA levels of patients in the migraine group were significantly higher than that in the control group. The SOD activity was significantly higher in the MWA as compared to MWOA. There was no significant correlation between these levels and headache attack period.

Serum arylesterase activities were significantly lower in migraineurs ($p=0.0065$), whereas total oxidant status was higher in patients compared to the controls ($p=0.0035$).

This preliminary study showed that oxidative/antioxidative balance shifted towards the oxidative status in migraine. Moreover, the results also suggested that decreased arylesterase activities might be associated with HDL-related dysfunction. Our data suggest that oxidative stress may represent a key event in the pathophysiology of migraine and a suitable therapeutic target.

In this study, we had found increased oxidative stress in the migraine patients especially the patients with MWA. Further knowledge about this issue may contribute the cause and complications of migraine and may be essential for development of treatment approaches.