Study of Antioxidant Enzymes, MDA and Lipid Profile in Cerebral Malaria

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ABSTRACT

Cerebral malaria (CM) is the most important complication of falciparum malaria. However, its pathophysiology is not understood. Malaria infection is accompanied by increased production of reactive oxygen species (ROS) and the malaria parasites are sensitive to oxidative damage. So, we conducted a case-control study to estimate antioxidant activity, lipid peroxidation in 36 patients with CM. In present study, catalase (CAT), reduced glutathione (GSH) and lipid peroxidation product malondialdehyde (MDA) were increased significantly and superoxide dismutase (SOD) was decreased significantly in CM patients at the time of admission with respect to control group. After treatment, SOD activity was increased and MDA level was decreased; rest of the parameters did not show any significant change. So, the antioxidant enzyme has a prognostic role in CM.

Keywords: Cerebral malaria, catalase, reduced glutathione, superoxide dismutase, malondialdehyde

MATERIAL AND METHODS

Thirty-six patients of CM diagnosed in accordance to the guideline from medicine ward were selected in study group. Twenty-five age- and sex-matched healthy subject were selected in control group.

Blood samples were collected in plain and ethylenediamine-tetraacetic (EDTA) bulb at the time of admission and before one day of the discharge of the patients.

Erythrocytic reduced glutathione (GSH) was measured by Beutler method, catalase (CAT) was measured by Sinha method, superoxide dismutase (SOD) was measured by Fridorich method and plasma malondialdehyde (MDA) was estimated by Buege method. Lipid profile i.e. total cholesterol, triglyceride and high-density lipoprotein (HDL) cholesterol were tested by Accurex enzymatic kit method.

DISCUSSION

It is known that malarial infection is accompanied by increased production of ROS and the malarial parasites are sensitive to oxidative damage. The univalent reduction of oxygen results in a series of cytotoxic oxygen species such as superoxide anions (O₂⁻), hydrogen peroxide (H₂O₂) and hydroxyl radicals (OH⁻). These highly reactive species can cause a wide-spectrum of cell damage including lipid peroxidation, inactivation of enzymes, alteration of...
intracellular oxidation-reduction state and damage to DNA. Mammalian cells possess enzymatic antioxidant defenses to cope with oxygen free radicals e.g.: SOD, CAT and GSH peroxidase.

In the present study, oxidative stress and antioxidant defense system were altered in CM. The levels of reduced GSH, CAT, MDA, triglycerides and VLDL cholesterol were increased significantly (p < 0.001) at the time of admission in CM patients compared to that of control (Table 1, Figs. 1, 2, 4 and 5). While after the treatment, SOD levels were increased (Table 1 and Fig. 3) and MDA level was decreased (Table 1 and Fig. 4)
falling almost in the range observed in control. Rest of the parameters did not show any significant change (Table 1 and Figs. 1, 2 & 5).

CONCLUSION

The study suggests that monitoring of SOD and MDA parameters can be useful in prognosis of CM patients.

SUGGESTED READING


New Guidelines: Screen all Patients Aged 15-65 Years for HIV

The US Preventive Services Task Force (USPSTF) recommends screening all adults and adolescents aged 15-65 years for HIV, according to updated guidelines published online April 29 in the Annals of Internal Medicine. The new recommendation also applies to all pregnant women who have not yet been screened, including those in labor. (Source: Medscape)

New Sex 'Superbug' may be More Infectious than AIDS

Doctors are warning of a new sexually-transmitted superbug, which they fear could ultimately prove to be even more deadly than AIDS. The antibiotic-resistant strain of gonorrhea - now considered a superbug - was discovered in Japan two years ago. Experts have warned that the bacteria’s effects could match those of AIDS. (Source: TOI, May 7, 2013)

Chickens Pegged as Source of H7N9 Flu

Evidence from a single patient infected with the novel avian influenza virus H7N9 points to transmission from live poultry, Chinese researchers reported. The finding suggests that live poultry could be the source of the H7N9 outbreak, which has sickened 108 people in eastern China and killed 22 according to the latest official update from the World Health Organization. Investigations into the source are ongoing. (Source: Medpage Today)