



The Effect of Antiepileptic Drugs on İschemia Modified Albumin, Myeloperoxidase and Catalase Levels in Children With Idiopathic Epilepsy

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Introduction

The oxidant/antioxidant balance in epilepsy is regulated not only by seizures but also by antiepileptic drugs (AEDs). It has been shown that some AEDs in long-term use increase the formation of free radicals and cause oxidative damage within neuronal cells. However, antioxidant enzyme activities are found to be increased, decreased or unchanged in different studies.

Objectives

To evaluate the effects of AEDs on the oxidant/antioxidant status by measuring ischemia modified albumin (IMA), myeloperoxidase (MPO) and catalase levels in pediatric epilepsy patients.

Methods

Ninety epilepsy patients without other comorbidities and 30 healthy children of similar age and gender were included. The patients were receiving AEDs for at least 6 months. They were divided into three groups: Group 1: patients receiving valproic acid (n=30), group 2: patients receiving carbamazepine (n=30) and group 3: patients receiving levetiracetam (n=30). Catalase, MPO and IMA levels were measured in each group.

Results

The mean age and gender distribution were similar in all groups. IMA levels of patients receiving carbamazepine were significantly higher than the control group and the group receiving levetiracetam (p=0.010 and p=0.023, respectively). Myeloperoxidase level was significantly lower in the group receiving carbamazepine than the control group (p=0.016) (Table 1). There was no statistically significant difference in catalase levels between the groups (p>0.05)

Table 1. Oxidant and antioxidant values of the patient and control groups in this study

Parameters	Levetiracetam treated group (n: 30)	Valproate treated group (n: 30)	Carbamazepine treated group (n: 30)	Control group (n: 30)	P
IMA (ABSU)	0.87±0.05	0.90±0.03	0.91±0.03*	0.87±0.04	<0.05
MPO (U/L)	93.30±35.75	93.23±24.71	88.65±28.91 [†]	119.97±52.39	<0.05
Catalase (U/L)	190.42±8.15	188.96±6.40	191.50±7.83	188.51±8.60	>0.05

Values are mean± SD

*P=0.010 compared with the control group and P=0.023 compared with the levetiracetam treated group

[†]P=0.016 compared with the control group

Conclusions

The existing knowledge about the impact of AEDs on free radical/antioxidant system is poor and controversial.

In our study, although there was no difference between the groups in catalase levels; IMA levels were found to be increased, whereas MPO levels were found to be decreased in the patient group receiving carbamazepine. These contradictory results may be explained by different origins of IMA (liver) and MPO (neutrophils) and production of these markers in response to different situations. IMA is produced as a result of hypoxic conditions, whereas MPO plays a significant role in microbial killing. Low MPO levels in the carbamazepine group may indicate that carbamazepine has MPO inhibitory properties. These conflicting results may also be related to methods in the measurement of biomarkers, the duration of antiepileptic drug treatment and the small number of study groups. This is the first study in which IMA was used to show the presence of oxidative stress related with AEDs.

References

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