NEUROPROTECTIVE EFFECTS OF ANTIEPILEPTIC DRUGS

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Experimental and clinical data indicate that epilepsy and seizures lead to neuronal cell loss and irreversible brain damage. This neurodegeneration results not only in the central nervous system dysfunction but may also be responsible for the decreased efficacy of some antiepileptic drugs (AEDs). The aim of this review was to assemble current literature data on neuroprotective properties of AEDs. The list of hypothetical neuroprotectants is long and consists of substances which act via different mechanisms. We focus on AEDs since this heterogeneous group of pharmaceuticals, as far as mechanisms of their action and mechanisms of neuronal death are concerned, should provide protection in addition to antiseizure effect itself. Most studies on neuroprotection are based on animal experimental models of neuronal degeneration. Electrically and pharmacologically evoked seizures as well as different models of ischemia are frequently used. Although our knowledge about properties of AEDs is still not complete and discrepancies occasionally occur, the group seems to be promising in terms of neuroprotection. Some of the drugs, though, turn out to be neutral or even have adverse effects on the central nervous system, especially on immature brain tissue (barbiturates and benzodiazepines). Unfortunately, we cannot fully extrapolate animal data to humans, therefore further well designed clinical trials are necessary to determine neuroprotective properties of AEDs in humans. However, there is a hope that AEDs will have a potential to serve as neuroprotectants not only in seizures, but perhaps, in other neurodegenerative conditions in humans as well. The novel AEDs (especially lamotrigine, tiagabine, and topiramate) seem particularly promising.

Key words: neuroprotection, neurodegeneration, antiepileptic drugs, seizures, ischemia

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