Research article

A.V.Ivanov
V.I.Opryshko

State institution "Dnipropetrovsk Medical Academy of the Healthcare Ministry of Ukraine"

Key words: anticonvulsant therapy, nootropics, combination therapy, morphological changes, side effects.

Received: 11.09.2013
Accepted: 25.10.2013

UDC: 615.214:612.821.2:616.8-009.12

EFFICIENCY OF COMBINED CARBAMAZEPINE AND NOOTROPICS TO REDUCE SIDE EFFECT OF ANTICONVULSANT THERAPY

The study is the part of research work "Investigation of the pharmacological properties of non-steroid anti-inflammatory drugs in conditions of depression, epilepsy and parkinsonism equivalents" (state registration 0113U000630).

ABSTRACT. Background. The high rate of epileptic disease spreading determines the need of antiepileptic drugs investigation. Carbamazepine, being one of the most effective anticonvulsant drugs, has a wide spectrum of common side effects, and one of the supposed ways to solve this problem is to combine carbamazepine with nootrops. The possibility of the combined anticonvulsant and nootropic therapy still needs further researches. **Objective.** To study the efficiency of the combined carbamazepine and nootrops use in the experiment on rats and mice to reduce the side effects of anticonvulsant therapy in the form of impaired cognitive brain function and performance. **Methods.** The research was conducted on 50 white rats and 30 white mice divided randomly in 5 groups: group 1 received carbamazepine 40mg/kg; group 2 – carbamazepine 40 mg/kg + pyracetam 500 mg/kg; group 3 – carbamazepine 40 mg/kg + citicoline 500 mg/kg; group 4 – carbamazepine 40 mg/kg + memantine 10 mg/kg; group 5 – intact animals (control group). The myorelaxing effects of the therapy, physical working capacity, neurotoxity of the drugs were estimated on the 4th day of nootrops administration and 30 minutes after single carbamazepine administration. Histological examination of the brain specimens was performed; the doses of carbamazepine used in morphological study were 40 mg/kg, 150 mg/kg and 720 mg/kg intragastrally. **Results.** Administration of carbamazepine occurs moderate morphological changes of brain tissue caused by a reaction on the part of the microvasculature, the severity of which depends on the dose of the drug. **Conclusion.** The most effective combinations that remove the central side effects of carbamazepine are carbamazepine + gliatilin and carbamazepine + citicoline.

✉ **valentina_pharma@mail.ru**

Citation:
Ivanov AV, Opryshko VI. [Efficiency of combined carbamazepine and nootropics to reduce side effect of anticonvulsant therapy]. Morphologia. 2013; 7(3):37-42. Russian.

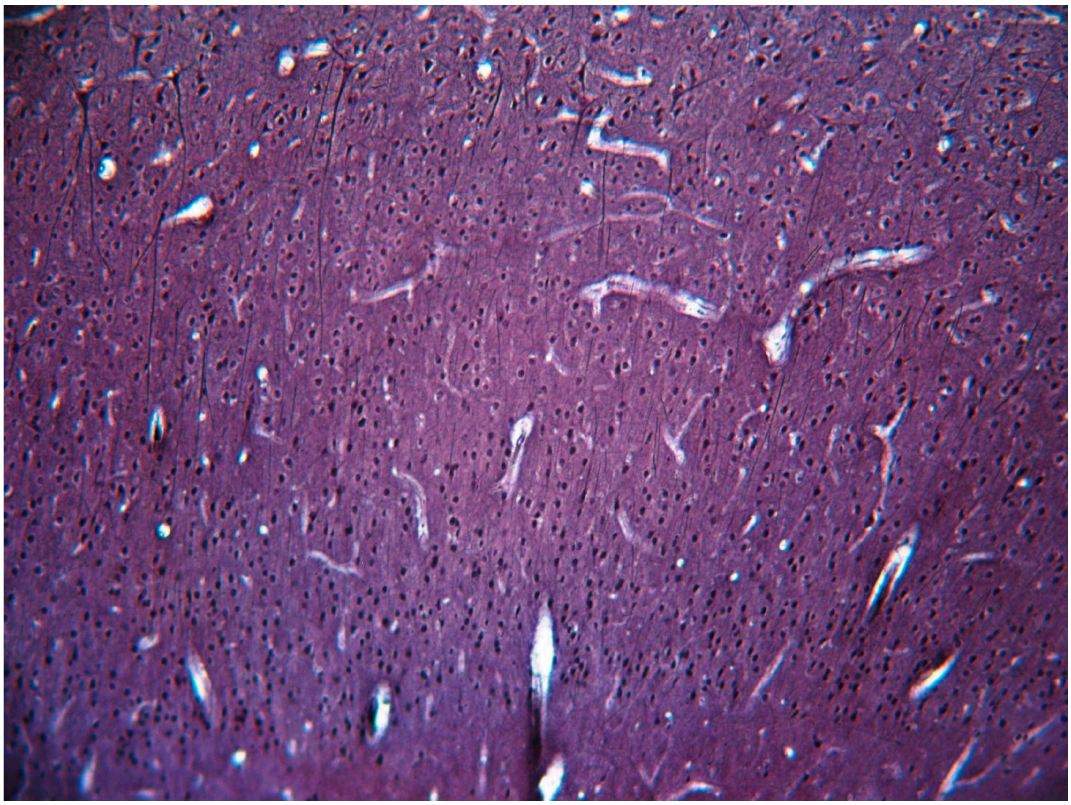

Fig. 1. Area of the rat brain frontal lobe cortex after the administration of carbamazepine 40mg/kg. Hematoxylin & Eosin staining. Magnification ×200.

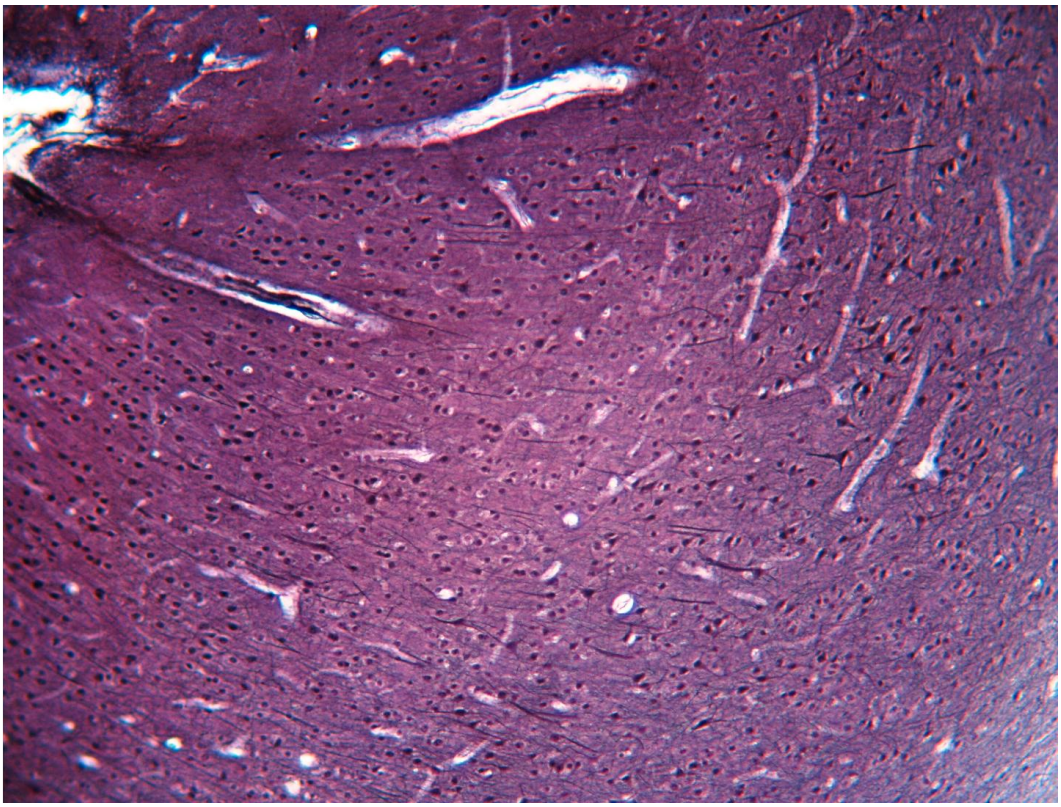

Fig. 2. Area of the rat brain frontal lobe cortex after the administration of carbamazepine 720mg/kg. Hematoxylin & Eosin staining. Magnification ×200.

References:

1. Kozhemyakin YuM, Khromov OS, Filonenko MA, Sayfetdinova GA, authors. Solovyov AI, editor. Naukovo-praktychni rekomendatsiyi z utrymannya laboratornykh tvaryn ta roboty z nymy [Scientific and practical advice on the maintenance of laboratory animals and work with them]. Kyiv: Avitsenna; 2002. 156 p. Ukrainian.

2. Badalyan OL, Nerobkova LN, Voronina TA, Avakyan GN, Markina NV, Burd SG, Stoiko MI, Oleinikova OM, Mitrofanov AA. [Experimental investigation of the effect of carbamazepine on the structure – function relationships in the epileptic system development in rats with cobalt-induced epilepsy]. Eksperimental'naya i klinicheskaya farmakologiya. 2002; 65 (2): 6-8. Russian.

3. Volkova OV, Yeletskiy YuK. Osnovy gistologii i gistologicheskoy tekhniki [Fundamentals of histology and histological techniques]. 1st ed. Moscow: Meditsina; 1971. p. 201-4. Russian.

4. Voronina TA, author; Vein AM, Mosolov SN, editors. [Anticonvulsants in psychiatric and nevrological practice]. Saint Petersburg: Meditsinskoye informatsionnoye agentstvo; 1994. Chapter 1, [Farmacology of modern anticonvulsants]; p. 3-30. Russian.

5. Zapadnyuk IP, Zapadnyuk VI, Zakhariya YeA, Zapadnyuk BV. Laboratorniye zhivotniye: Razvedeniye, soderzhaniye, ispolzovaniye v eksperimente [Laboratory animals. Breeding, maintenance, use in experiments]. 3rd ed. Kiev: Vyscha shkola; 1983. 380 p.

6. Zenkov LR. Klinicheskaya epileptologiya (s elementami neyrofiziologii) [Clinical epileptology (with elements of neurophysiology)]. Moscow: Meditsinskoye informatsionnoye agentstvo Ltd; 2002. p. 312-3. Russian.

7. Stefanov OV. Doklinichni doslidzhennya likars′kykh zasobiv: metodychni rekomendatsiyi [Preclinical studies of drugs: guidelines]. Kyiv: Avitsenna; 2002. 527 p. Ukrainian.

8. Lason W. Pro- and antiapoptopic effects of anticonvulsant drugs. In: [6th Conference on Progress in Etiopathogenesis of Seizures; 2001 Nov 16; Lublin]. Pol J Pharmacol. 2002;54(1):79.