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The Influence of Nootropil on the Content of Inorganic Phosphorus and Lipid Phosphorus in the Blood of Patients with Intracerebral Haemorrhage

Wpływ Nootropilu na zawartość fosforu nieorganicznego i fosforu lipidowego we krwi chorych z krwotokiem śródmózgowym

Nootropil exerts positive impact on both intracortical and cortico-subcortical conduction and increases ATP content in the nerve cell which leads to the increase of ribonucleic acid's synthesis necessary for long duration memory and proteins essential for the production of enzymes (3).

The cerebral stroke can change the activity of the central vegetative neurons and induce generalized disturbances of the mechanism of metabolism, e. g. in phosphorus and phospholipid economy (1, 2).

The aim of the present paper was to estimate the influence of Nootropil on the concentration of both inorganic and lipid phosphorus in the blood of patients with cerebral stroke.

MATERIAL AND METHOD

Examinations were carried out on 15 patients with intracerebral haemorrhage and control group of 20 persons with radicular syndromes in the period of remission.

Blood samples for determination of inorganic and lipid phosphorus concentration were taken from the ulnar vein with the patient on an empty stomach and on the 1st, 2nd, 3rd and 4th hr after intravenous applying of Nootropil in the dose of 2 g. Determinations of the content of inorganic phosphorus and lipid phosphorus were carried out on the 1st, 3rd, 7th and 14th day of illness.

The concentration of inorganic phosphorus in the blood was estimated by means of the Fiske-Subbarow method, whereas the content of lipid phosphorus in the blood was estimated by means of the Hochmayer and Fried method. The results of these examinations underwent statistical analysis.

RESULTS

The average content of inorganic phosphorus and lipid phosphorus in the blood of the control group proved to be in agreement with the values considered to be correct in the literature.

After the application of Nootropil one could observe no statistically significant changes in the concentration of inorganic phosphorus in the blood of the control group ($p < 0.05$) whereas the concentration of lipid phosphorus decreased by 0.38 mg% and the difference proved to be statistically significant ($p < 0.05$).

In all patients with intracerebral haemorrhage, on the 1st day of illness on an empty stomach, the concentration of inorganic phosphorus in the blood was by 0.2 mg% bigger than the corresponding control concentration. On the 3rd day the difference was 0.14 mg% and it was statistically insignificant ($p > 0.05$). During the 7th and 14th day, on an empty stomach, the contents of inorganic phosphorus were smaller than the corresponding control concentrations by: 0.18 and 0.35 mg%, resp. All the differences were statistically insignificant ($p > 0.05$).

After intravenous applying of Nootropil during all the days of illness, in the 4th hr of examination the average concentration of inorganic phosphorus in the blood of patients was smaller than the corresponding control concentrations: on the 1st day — by 0.02 mg%, on the 3rd day — by 0.03 mg%, on the 7th day — by 0.09 mg % on the 14th day — by 0.27 mg%. All the differences were statistically insignificant ($p > 0.05$).

Average contents of lipid phosphorus in the blood of patients with intracerebral haemorrhage on an empty stomach were bigger than the corresponding control concentrations by: on the 1st day — 0.15 mg% and on the 3rd day — 0.32 mg% whereas on the 7th and 14th day they were smaller by 0.18 and 0.91 mg%, resp. The differences were statistically insignificant ($p > 0.05$).

After intravenous applying of Nootropil in the 4th hr of examination, the average concentration of lipid phosphorus in the blood of the sick with intracerebral haemorrhage on the 1st day was bigger by 0.03 mg% whereas on the 3rd, 7th and 14th day it proved to be smaller than the corresponding control concentrations by: 0.13, 0.29 and 1.58 mg%. The last of the pointed out differences proved to be statistically significant ($p < 0.05$), the rest had no statistical significance ($p > 0.05$).

DISCUSSION

Examinations carried out on patients with intracerebral haemorrhage revealed the increase of inorganic phosphorus content in the peripheral blood. Slight hyperphosphataemia diagnosed in the earliest stage of illness had an

increasing tendency in the first week of illness, then came back to normal after approx. 2 weeks.

In these patients a slight increase of lipid phosphorus was revealed during the 1st and 3rd day of illness with systematic normalisation of concentrations during 14-day observation period.

The obtained results allow making only a general suggestion that the sick with intracerebral haemorrhage exhibit destabilization of phosphorus economy.

As the value of Nootropil as a drug improving bioenergetic metabolism of the nerve cell has been acknowledged, the influence of this drug on phosphorus economy in the sick with intracerebral haemorrhage was assessed.

It was found that single application of 2 g of Nootropil by means of short intravenous influx caused in healthy people a decrease of inorganic phosphorus content in the blood by approx. 4% in relation to the initial level. Phosphataemia came back to normal after 4 hrs. The same tendency was observed in the group of patients with intracerebral haemorrhage, but only during the acute stage of the illness (the 3rd day).

The analysis of lipid phosphorus concentrations revealed that in healthy people they decrease by approx. 4% under the influence of Nootropil. In the group of patients with intracerebral haemorrhage after Nootropil application, gradual decrease in phosphorus concentrations was observed during 4 hrs of examination. The concentrations dropped by 4, 7, 4 and 6%, resp. during the 1st, 3rd, 7th and 14th day of illness when compared with the levels acknowledged before this drug application.

Despite differences in lipid phosphorus concentrations before and after application of Nootropil were bigger in the sick than in the control group, they were found statistically significant only on the 14th day of observation.

Interpreting the influence of Nootropil on phosphorus content in the blood one may assume that it caused slight and transient decrease in inorganic phosphorus concentration in both healthy people and patients with intracerebral haemorrhage, but only in the early stage of illness, and permanent decrease of initially elevated values of lipid phosphorus in the sick.

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STRESZCZENIE

Oceniając wpływ Nootropilu na zawartość fosforu we krwi stwierdzono, że powodował on niewielkie i przemijające obniżenie stężenia fosforu nieorganicznego u osób zdrowych i u chorych z krwotokiem śródmózgowym, ale tylko w początkowym okresie choroby, oraz trwałe zmniejszenie podwyższonych wstępnie wartości fosforu lipidowego u badanych osób chorych.