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The Effect of Intravenous Loading with Glucose on Inorganic Phosphorus and Lipids-Bound Phosphorus in the Patients with Subarachnoid Haemorrhages (SAH)

Wpływ dożylnego obciążenia glukozą na zawartość fosforu nieorganicznego i fosforu związanego z lipidami u chorych z krwawieniem podpajęczynówkowym

Nervous tissue is especially rich in phosphorus compounds, mainly represented by phospholipids, cerebrosides, gangliosides and phosphates. Well-known are the elaborations concerning the occurrence of disturbances in carbohydrate metabolism in the patients with different forms of cerebral stroke (1—3).

Phosphorus coming from different sources is actively involved in glucose metabolism, therefore it is essential to determine the interdependence between what happens to this element in the patients with acute vascular brain injury and transient hyperglycaemia in the course of this disease.

Own investigations aimed at determining the effect of glucose introduced to the organism of patients with SAH, which is quite often practiced for therapeutic reasons, on the concentration of inorganic and lipid phosphorus in the blood of these patients.

MATERIAL AND METHODS

The control group consisted of 25 healthy persons, and the group with acute, SAH, of 25 persons.

Determination of inorganic and lipid concentration was performed on an empty stomach as well as in the 4th, 34th, 64th and 124th min since the termination of loading with glucose, 60 ml of 40% glucose solution has been applied intravenously for 4 min. In the control group the glucose loading test as well as all other examinations were carried out only once, whereas in the patients — in the 1st, 3rd, 7th and 14th, 24 hrs of the disease.

Determinations of inorganic phosphorus were performed by means of the Fisk-Subarov's method in Śliwińska's modification and, of lipid phosphorus — by means of the Hochmeyer and Fried's method, the results of investigations were subject to statistical analysis.

RESULTS OF EXAMINATIONS

Before carrying out the loading with glucose the concentration of inorganic phosphorus in the blood of controlled person was 3.5 mg% on the average. In the 4th, 34th, 64th and 124th min of the loading test the level of the examined element in the blood lowered and it was random ($p > 0.05$).

The average content of lipid phosphorus in the blood before loading with glucose in the control group was within the scope of values given in the literature as normal. In the 4th, 34th, 64th and 124th minute of loading with glucose the average initial condensation decreased successively by: 0.2, 0.4, 0.3 and 0.5 mg% statistically insignificantly ($p > 0.05$).

In order to estimate the effect of intravenous application of glucose on the level of inorganic phosphorus and lipid phosphorus an analysis of correlation was made between the content of phosphorus and concentration of glucose in the blood in the particular stages of the loading test. In the control group the values of the examined correlation coefficient between glucose concentration and the content of inorganic phosphorus in the blood oscillated between 0.09 and 0.12; between glucose concentration and content of lipid phosphorus in the blood between -0.2 and 0.2 and were statistically insignificant ($p > 0.05$).

In the patients with SAH in the first 24 hrs before loading with glucose and just after loading, the concentrations of inorganic phosphorus and lipid phosphorus in the blood of all the patients were within the scope of control concentrations and differed from them statistically insignificantly ($p > 0.05$), the average levels of lipid phosphorus were, successively: 9.7, 9.8, 10.9, 10.9, 10.7 mg% and differed from the respective control concentrations statistically randomly ($p > 0.05$).

The value of the examined correlation coefficient between the concentrations of inorganic phosphorus and the content of glucose on an empty stomach in the first 24 hrs of the disease was 0.52. It was proved that the examined correlation occurs statistically significantly ($p < 0.05$).

After introducing the load in all the above-mentioned points of time of the test, the values of the examined coefficient of correlation between the content of glucose and concentration of inorganic phosphorus ranged from -0.45 to 0.18. Statistical analysis has proved that the examined correlations occur statistically insignificantly ($p > 0.05$).

The values of the coefficient of correlation between the concentrations of inorganic phosphorus in the 3rd, 7th and 14th 24 hrs of the clinical observation fluctuated statistically insignificantly, between -0.07 and 0.16 as regards the statistic aspect ($p > 0.05$).

The value of the coefficient of correlation between the concentrations of lipid phosphorus and glucose before loading in the 1st 24 hrs of the disease was 0.32, whereas after loading with glucose in all points of time of the loading test, the

values of the correlation coefficient oscillated from 0.27 to 0.40. It was proved that the examined correlations occur statistically insignificantly ($p > 0.05$).

The values of the correlation coefficient between the concentrations of lipid phosphorus and content of glucose in the blood of patients with SAH in the 3rd, 7th and 14th 24 hrs of the clinical observation ranged from -0.04 to 0.32. Statistical analysis has proved that the examined correlations occur statistically insignificantly ($p > 0.05$).

DISCUSSION

Results of investigations which deal with the level of inorganic and lipids phosphorus in blood samples from patients with SAH, before and after the loadings with glucose, allowed to point out that there are disturbances in phosphorus concentration, but only in some patients in clinical condition and it seemed to be statistically unimportant.

Own investigation aimed at determining the effect of glucose introduced to the organism of patients with SAH, which is quite often practiced for therapeutic reasons, on the concentration of inorganic and lipid phosphorus in the blood of these patients.

Although phosphorus, coming from different sources, is actively involved in glucose metabolism, no permanent and significant dependence was found between what happens to the element in the patients with SAH and short-lasting hyperglycaemia occurring under the influence of loading with glucose.

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STRESZCZENIE

Oceniono wpływ glukozy wprowadzonej do ustroju chorych z krwawieniem podpajęczynówkowym na stężenie fosforu nieorganicznego i lipidowego we krwi tych chorych. Ustalono występowanie zaburzenia gospodarki fosforowej u chorych z krwawieniem podpajęczynówkowym, ale tylko u niektórych pacjentów i w sposób statystycznie nieistotny. U chorych z krwawieniem podpajęczynówkowym nie stwierdzono stałej i istotnej zależności zawartości fosforu od przemijającego przecukrzenia krwi występującego pod wpływem obciążenia glukozą.