
Katedra i Klinika Neurologii. Akademia Medyczna w Lublinie
Kierownik: prof. dr hab. n. med. Wiesław Kawiak

Maria PILARCZYK

The Effect of Intravenous Loading with Glucose on Inorganic Phosphorus and Lipid Phosphorus in the Blood of Patients with Intracerebral Haemorrhage

Wpływ dożylnego obciążenia glukozą na zawartość fosforu nieorganicznego i lipidowego we krwi chorych z krwotokiem śródmózgowym

Among complex metabolic processes which take place in the liver and undergo humoral and nervous regulation, synthesis and breakdown of phospholipids are of significant significance (1).

Cerebral stroke may change the activity of the central vegetative neurons and lead to generalized disturbances of the mechanism of metabolism.

Among factors responsible for water-electrolyte balance, correct functioning of the nervous system is mentioned. Literature is abundant in reports indicating occurrence of water-electrolyte balance disturbances in the diseases of the central nervous system (2).

The aim of the present paper is to estimate inorganic phosphorus and lipid phosphorus in the blood of patients with intracerebral haemorrhage on an empty stomach and after loading with glucose in the earliest stage of illness.

MATERIAL AND METHOD

Examinations were carried out on 15 patients with intracerebral haemorrhage, the control group consisted of 25 persons with radicular syndromes in the period of symptoms' remission.

Blood samples for determination of inorganic phosphorus and lipid phosphorus were taken from the ulnar vein with the patient on an empty stomach and in the 4th, 34th, 64th and 124th minute after loading with glucose, while loading 60 ml of 40% glucose solution was used. Examinations were carried out on the 1st, 3rd, 7th and 14th day of illness and the results of determinations were compared with the results of the control group.

The concentration of inorganic phosphorus was determined by means of the Fiske—Subbarov method whereas the concentration of lipid phosphorus was determined by means of the Hochmayer and Fried method, the results of the examinations underwent statistical analysis.

RESULTS

Before loading with glucose was performed, the concentration of inorganic phosphorus in the blood of the control group had the mean value of 3.5 mg%. In the 4th, 34th, 64th and 124th minute of the loading test, the level of the examined element in the blood lowered to 0.1 mg% and was random ($p > 0.05$).

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

In the group of patients with intracerebral haemorrhage average concentrations of inorganic phosphorus in the blood, with the patient on an empty stomach, on the 1st and 3rd day of illness, proved to be higher than the average content of inorganic phosphorus in the blood of the control group. After loading with glucose test, the high mean concentration of inorganic phosphorus was found in the 4th minute, in the 34th minute on the 3rd, 7th and 14th day of illness. The differences were statistically significant ($p < 0.05$). In the remaining times of testing and days of illness, average concentrations of inorganic phosphorus in the blood of patients were close to the average control concentrations and the differences were statistically insignificant ($p > 0.05$).

Assuming liminal control values as a base, the content of lipid phosphorus in the blood of patients with intracerebral haemorrhage proved to be higher than the upper limit of the control value on the 1st and 7th day, with patients on an empty stomach in 11 patients and on the 3rd day in 12 patients on an empty stomach. The differences were statistically significant ($p < 0.05$). After loading with glucose test, higher mean concentrations of lipid phosphorus were observed in the blood of the sick in the 4th, 34th, 64th and 124th minute on the 1st, 3rd and 7th day of illness. The differences were statistically significant ($p < 0.05$). On the 14th day of illness a higher mean concentration of lipid phosphorus was found in 6 patients on an empty stomach, and after loading with glucose test in 6 patients in the 4th minute of examination, in 5 patients in the 34th minute and in 4 patients in the 64th minute of examination, but the differences were not statistically significant ($p < 0.05$).

DISCUSSION

The presented results of my own investigations concerning concentrations of inorganic phosphorus and lipid phosphorus in the blood of patients with intracerebral haemorrhage allowed diagnosing disturbances of the balance

depending on patients' clinical state and intensification of illness. The disturbances lie in the increase of inorganic phosphorus content in the blood of patients on the 1st and 3rd day of illness. Explanation of the diagnosed disturbances in phosphorus balance is quite difficult. Usually very bad patients' general state, sometimes accompanied by consciousness disturbances and often present pathological changes in the cardiovascular system in these patients, may cause multidirectional systematic disturbances.

Results of my own investigations on phospholipid balance reveal its disturbance in patients with intracerebral haemorrhage. It is worth noticing that the content of lipid phosphorus in the blood of patients in the initial stage of illness increases and then normalises during further observation period. This may prove that the increase of lipid phosphorus concentration depends on the presence of products of the cerebral tissue breakdown and the rapidity of its elimination from haemorrhagic focus.

The assumption of my own investigation was also to estimate the influence of glucose introduced to the patients with intracerebral haemorrhage, which is quite often performed for therapeutical purposes, on the behaviour of inorganic phosphorus and lipid phosphorus in the blood of the sick. In spite of the fact that phosphorus originating from various sources is actively involved in glucose metabolism in healthy conditions, my own investigations reveal no stable and significant dependence of this element in patients with intracerebral haemorrhage on transient hyperglycemia occurring under the influence of loading with glucose.

REFERENCES

1. Michel R. H.: Phospholipids in the Nervous System. Vol. I.: Metabolism. Red. L. Horrocks et al., Raven Press, New York 1982.
2. Wender M. et al.: Zaburzenia metaboliczne w udarach mózgu. *Neur. Neurochir. Psychiatr. Pol.* **2**, 169, 1961.

Otrzymano 1995.07.28

STRESZCZENIE

Badano zawartość fosforu nieorganicznego i lipidowego we krwi chorych z krwotokiem śródmózgowym na czczo i po obciążeniu glukozą w najwcześniejszym okresie choroby. U chorych z krwotokiem śródmózgowym występuje istotny wzrost stężenia fosforu nieorganicznego i lipidowego we krwi tuż po wystąpieniu krwotoku, a u części chorych również w XIV dobie choroby. U chorych z krwotokiem śródmózgowym nie stwierdzono stałej i istotnej zależności zawartości fosforu od przemijającego przecukrzenia krwi występującego pod wpływem obciążenia glukozą.

