BONES OF SLAUGHTER ANIMALS - ONE OF THE SOURCES FOR PRODUCING EFFECTIVE CURATIVE PREPARATIONS

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Introduction

The disorders of mineral metabolism in human organism is the result of washing out of calcium from the bone tissue, which leads osteoporosis of various etiology, with avitaminosis, etc. At VNIIMP a technology of producing the substance of the preparation from bones slaughter animals, normalizing the state of mineral metabolism in human organism was developed. To confirm a specific influence of substance a study of its specific action, especially, the influence on biochemical indices, characterizing the state of calcium-phospho metabolism and blood coagulation was undertaken.

Experimental methods. To solve the posed problem the following indices of calcium-phosphorus metabolism in mammalians were studi activity of alkaline phosphatase and the levels of calcium and phosphorus in blood serum and bone tissue, as well as the indices (Ca)((Ca)x(P), level of oxyprolin and phosphorus in the urine. The rats have had special diets during five weeks, which led to the state, close to avitaminosis. The substance at the dose 25 mg/kg and 50 mg/kg was given per os to two groups of animals during the whole period investigations. On the day of the experiment (10th, 20th, 35th) the animals were killed, the blood was collected and the serum was obtain From both hind legs the thigh bones were separated and cleared from the muscles. The day-long urine was collected in metabolic cells. Besides, the role of calciumions in hemostatic activity of thrombocytes using the substance was evaluated. The investigations were carried on male rabbits of breed "Shinshila", to whom the substance at 20 mg/kg together with food was each day incorporated during 21 da without intervals. The blood was taken from the border vein of the ear before the incorporation of the preparation on the 3rd, 7th, 10th, 1 and 21st days and 1 week after the cancellation of the experimental therapy. The following parameters were determined: thromboelastogram time of recalcification, tolerance of the blood to heparin, thromboplastinic time, partially activated thromboplastinic time (PATT), aggregat capability of thrombocytes. Groups of animals were formed: group K - special diet; group K+control.

Results: Table 1 shows the results of the influence of the substance on biochemical indices, characterizing the state of calcium-phospho metabolism of animals.

The data of the Table 1 show a sharp increase in the activity of alkaline phosphatase in the blood serum of rats, being on special diet (group K as compared to the normal animals (group K+). This increase in the acitivity of the enzyme is one of the first and specific evidence of avitaminosis, followed by the washing out of calcium from the bones. The used diet led to noticeable decrease of calcium content in the bo of rats in group K- as compared to the normal animals on the 10th and 35 th day of the experiment (Table

Tab

Time (days)	Groups	Biochemical indices in blood serum				
		Activity of alkaline phosphatase, u/n	Phosphorus content, Mm/ml	Calcium content μmole/ml	Ratio calcium/phosphrus	Product of calciu by phosphoru
10	K+	204,4 + 30,8	631,0 + 94,2	1,46 + 0,15	2,37 + 0,22	994,5 + 182,0
n=5	K-	326,5 + 42,5	998,1 + 94,1	2,15 + 0,18	2,29 + 0,37	2086,3 + 112,2
	K- +25 mg/kg	178,0 + 37,3	789,2 + 288	1,75 + 0,08	3,23 + 0,74	1375,5 + 481,1
	K- +50 mg/kg		1238 + 302	3,47 + 0,16	3,44 + 0,75	4269,7 + 1029
20	K+	398,3 + 31,1	689,5 + 57,9	1,84 + 0,27	2,75 + 0,4	1270,4 + 230,0
n=5	K-	509,1 + 25,9	727,1 + 81,6	2,26 + 0,08	3,33 + 0,52	1620,3 + 137,8
	K- +25 mg/kg	395,0 + 35,9	439,9 + 53,6	1,74 + 0,11	4,12 + 0,45	779,6 + 145,1
	K- +50mg/kg	478,0 + 50,9	494,0 + 27,1	3,24 + 0,21	6,73 + 0,82	1586,5 + 67,8
35	K+	382,5 + 62,2	753,7 + 38,7	2,44 + 0,13	3,35 + 0,3	1831,3 + 112,8
n=10	K-	367,9 + 32,9	750,6 + 78,4	2,58 + 0,28	3,76 + 0,63	1963,2 + 333,7
	K- +25 mg/kg	443,2 + 46,1	794,5 + 56,9	1,84 + 0,11	2,41 + 0,22	1464,0 + 145,7
	K- +50 mg/kg	404,4 + 35,5	917,3 + 47,5	1,56 + 0,01	1,69 + 0,06	1464,9 + 172,7

The increase of calcium level in the bone tissue of the animals having the substance was observed already on the 20th day of the experim (Table 2). An increase of the oxyprolin level in the urine, which is also one of the characteristic features of calcium-phosphorus metabo disorder, was noted in the group of the animals, being on the diet, on the 10th and 35th days of the experiment (Table 3).

Discussion: In general as to the main indices, (Tables 1,2,3) the used diet helped to the development of the changes in calcium metabo usually characteristic of osteoporosis and D-avitaminosis. Against this changed background a normalizing effect of the used substance

well pronounced, that concerned not only the above indices, but also of the often used index (Ca)/(P) in blood serum. The observed differences in the effect of the diets and of the substances at different time of the experiment can be associated with the dynamics of metabolic disorders and their age peculiarities. Besides, the less of the used doses (25 mg/kg) by a number of the indices proved more effective, than the greater dose (50 mg/kg).

Table 2 shows biochemical indices, characterizing the state of metabolism in bone tissue of animals under the influence of the substance

Table 2

Time (days)	Groups	Biochemical indices in bone tissue (nmol/mg of bones)	
		Calcium content	Phosphorus content
10 n=9	K+	599,4 + 38,6	893,0 + 44,2
	K-	495,1 + 20,5	978,3 + 33,3
	K- +25 mg/kg	463,8 + 19,3	978,9 + 38,3
	K- +50 mg/kg	475,3 + 16,7	1094 + 43,9
20 n=10	K+	565,1 + 49,3	962,4 + 24,4
	K-	584,4 + 19,6	1026 + 37,1
	K- +25 mg/kg	789,6 + 77,6	1017 + 44,3
	K- +50 mg/kg	571,3 + 33,2	984,5 + 57,5
35 n=19	K+	410,2 + 16,4	926,7 + 20,7
	K-	326,1 + 14,6	997,8 + 20,7
	K- +25 mg/kg	580,2 + 36,3	961,6 + 17,7
	K- +50 mg/kg	457,5 + 28,4	1000,0 + 20,6

Table 3 shows the results of the influence of the substance on biochemical indices in the urine of rats

Table 3

Time (days)	Group	Biochemical indices in the urine of rats nmol/ml	
		Level of phosphorus	Level of oxyprolin
10 n=5	K+	2243,4 + 729,9	26,2 + 8,0
	K-	2959,0 + 679,5	303,5 + 90,1
	K- +25 mg/kg	5691,9 + 2734,7	128,7 + 34,1
	K- +50 mg/kg	4754,5 + 1043,3	344,4 + 89,1
20 n=5	K+	6510,5 + 1115,0	427,6 + 62,7
	K-	17403, + 2571,2	586,5 + 46,4
	K- +25 mg/kg	9050,1 + 2211,1	562,3 + 122
	K- +50 mg/kg	9174,7 + 2007,1	526,3 + 76,5
35 n=5	K+	5256,4 + 1253,5	190,2 + 12,1
	K-	10956,4 + 1122,0	342,0 + 48,9
	K- +25 mg/kg	8393,4 + 1948,0	251,5 + 11,0
	K- +50 mg/kg	6618,7 + 2267,8	273,5 + 41,0

The investigations of the state of blood coagulation under the influence of three-week feeding of rabbits by the substance of the preparation in a single daily dose 20 mg/kg suggests that this course of substance taking leads to the reactions in the organism that in total can lead to a decrease of the activity of the main factors of blood coagulation, that may be a cause of some decrease of blood coagulation. In connection with this it is useful to carry out a periodical control (once per two weeks) over the activity of the prothrombim complex of the patients (Prothrombin index) or use an integral method for the evaluation of the coagulation of the whole blood (thromboelastography).

Conclusions. The obtained results make it possible to make a conclusion about a sufficient effectiveness of the substance in curing the states, similar to osteoporosis.

References: Ostrovsky Yu.M. Experimental vitaminology.- Minsk: Nauka and Tekhnika, 1979; Pokrovsky A.A. Biochemical methods of investigations in clinics.- M.: Medicina, 1969.