

9:15 - 30. THE INFLUENCE OF CALCIUM, PHOSPHORUS, AND VITAMIN D ON THE BIOCHEMICAL BEHAVIOR OF LEAD DURING DELEADING. Albert E. Sobel, Samuel Sklersky, Joseph Goodgold, and Benjamin Kramer, Pediatric Research Laboratory, Jewish Hospital of Brooklyn.

These experiments are an extension of our previous studies on the biochemical behavior of lead during deleading. A group of 66 young rats of uniform heredity, 23 to 25 days of age, were placed on a diet containing lead for 29 days. At the end of that period the various litters were divided into three equal groups and placed on lead-free diets. Group A received low-calcium (0.150%) low-phosphorus (0.24%) diet, Group B received high-calcium (1.20%) low-phosphorus (0.24%) diet, Group C received a low-calcium (0.150%) high-phosphorus (1.06%) diet. One-half of each group received 100 I. U. vitamin D daily in addition to one of the above diets. At the end of 29 days the animals were sacrificed and the lead in the blood, bone, and brain was determined.

The highest blood lead values were found in group B (high Ca diet) in the absence of Vitamin D. The lowest values were found in group C (high-phosphorus diet). Vitamin D caused a decrease in the blood lead of all groups which was especially marked in group B. This behavior of Vitamin D is in contrast to its action during the dietary administration of lead when it causes an increase of blood lead on some diets, but at no time a decrease (Sobel, A. E., Yushka, H., Peters, D. D., and Kramer, B., J. Biol. Chem., 132, 239 (1940)).

The percentage lead in the ash of the femurs was highest in the group receiving high calcium. Vitamin D caused a decrease in the percentage lead in all groups. This effect was greatest in group B (high Ca). The variation in the percentage of lead was mainly due to changes in the ash content.

No statistically significant differences were obtained in the amount of lead retained in the brain.

Notes

Sobel concluded that a high-calcium, low-phosphorus diet is dangerous for plumbism, because blood Pb is raised by such a diet. The high-phosphorus diet seems to lower the blood Pb best.

The low-calcium and high-calcium diet resulted in practically the same absolute Pb storage in the bones, although the percentage Pb in the ash of the femurs was highest in the group receiving high-calcium.

During Pb exposure, vitamin D caused high blood and bone Pb, while after exposure had ceased, administration of vitamin D caused somewhat lower values than in those cases where the vitamin was omitted.

Dr. Calvary, who was presiding at the meeting, remarked in the discussion that in his own experiments low-calcium diets with normal phosphorus resulted in five to six times as much Pb in the bones as his high-calcium diet, in disagreement with the above results. He felt that the conditions of the individual experiments may have caused the discrepancy. He also emphasized

the remark that procedures for clinical treatment of cases of plumbism should not be based on only a relatively small number of experiments, but that the extensive literature regarding such treatment should have first consideration.

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