5403

Action of Viosterol and Parathormone in Thyroparathyroidectomized Dogs.

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(Introduced by George R. Cowgill.)

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The daily intake, output, and blood serum level of calcium and phosphorus, together with the muscular responses to electrical stimuli, were studied in 2 adult, female dogs before and after thyroparathyroidectomy. An extensive dissection was done in order to insure removal of all parathyroid tissue.

Throughout the investigation a basal ration prepared according to the technique of Cowgill[1] was employed. The *postoperative* period was divided into 3 parts. In the first, the animals received subcutaneous injections of parathormone.† In the second, viosterol‡ was administered by mouth. Because of its delayed action on calcium metabolism, the viosterol was at first supplemented by parathormone and then was given alone. In the third part, the dogs were allowed to subsist again on the experimental ration without the aid of either parathormone or viosterol.

Results. Phosphorus metabolism will not be discussed in this report. The following discussion of the calcium data from one of the animals serves to illustrate the results obtained.

During the *administration of parathormone,* the curve of urinary calcium rose and then fell, whereas that of the total output (feces essentially) was for the most part unchanged except for a slight final elevation. (See Fig. 1.)

During the *administration of viosterol* the curve of urinary calcium, after an initial lag, rose gradually and steadily, whereas that of the total output (feces essentially) fell to a low and fairly constant level.

In the *posttherapeutic phase* (basal diet alone without either supplement) the curve of urinary calcium continued to rise and then gradually fell in the course of about 2 weeks to the level that prevailed at the beginning of the administration of the viosterol. At first the total output of calcium stayed constant, then abruptly fell

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1 Cowgill, G. R., *J. Biol. Chem.*, 1923, **56**, 725.

† Donated by the Eli Lilly and Company, Indianapolis, Ind.

‡ Donated by the Mead Johnson and Company, Evansville, Ind.

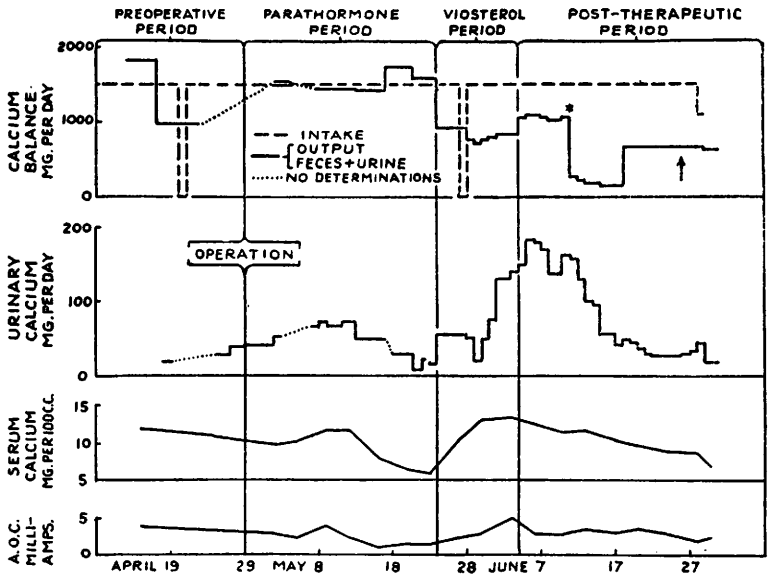

FIG. 1.

to a lower level than had been observed at any time before. It later rose to about two-thirds of the height from which the drop occurred, and it there remained unchanged. During this time (see arrow) the dog under consideration was discovered eating its feces. Consideration of the ash value of the stools and other observations makes it quite probable that coprophagy began at about the time (see asterisk) the marked drop in the fecal output of calcium occurred in the illustrative data here discussed.

It is of interest to point out the parallelism exhibited by the curves of the anodal opening contraction, blood serum calcium and, to a lesser degree, that for the urinary calcium. In the case of the last-named, both the rise and fall were somewhat delayed as compared with the curves for electrical reaction and blood serum calcium.

Conclusions. 1. In thyroparathyroidectomized dogs suitable doses of either viosterol or parathormone will cause a rise in the level of the blood serum calcium, which is remarkably parallel to that of the electrical reaction figures, and, to a lesser extent, that of the urinary calcium excretion values. 2. The elimination of calcium by way of the feces is apparently increased during the administration of parathormone and is decreased during that of viosterol, thus tending to produce a negative calcium balance in the former and a positive one in the latter instance.