Effect of Hypothermia on the Secretion of 17-Hydroxycorticosteroids of the Adrenal Glands in Non-Anesthetized Dogs

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The present investigation aims to know how hypothermia affects the secretion of 17-hydroxycorticosteroids of the adrenal glands in non-anesthetized dogs.

The experiments were performed in 5 dogs. The adrenal venous blood was collected by the lumbar route method of Satake, Sugawara and Watanabe, without anesthetizing or even fastening the animals. The plasma was separated from the collected blood samples by centrifugation and was analyzed for 17-hydroxycorticosteroids by the method of Nelson and Samuels. In order to induce hypothermia, the animals were immersed into ice-water for 19-45 minutes and were then taken out. The body temperature fell markedly from 38.8-40.0°C, its lowest level (26.3-32.0°C) being noted 5-25 minutes after the withdrawal from the ice-water bath. Then it rose gradually.

The basal rate of 17-hydroxycorticosteroids secretion was determined as 0.17-0.48 μg. per kg. of body weight per minute, the average being 0.30 μg. After the cold application it increased invariably, 0.35-1.0 μg. being reached. Compared with the initial rate in respective cases, the maximum was 1.7-2.9 fold.

In 2 out of 5 cases an increase in the secretion rate was observed soon after the withdrawal and the maximum was reached within 20 minutes or so. In 3 others, however, an increase was preceded by a 20-60% decrease in the secretion rate, the maximum increase being observed within 1-2 hours.

These experimental results are not in consonance with those obtained by Egdahl, Nelson and Hume in anesthetized dogs. In their experiments only definite fall in the 17-hydroxycorticosteroids secretion rate was observed.