Effect of Adrenalectomy on Dehydroascorbic Acid Diabetes.* (19208)

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Although dehydroascorbic acid is a normal cellular constituent it produces diabetes resembling that from alloxan(1-3). Adrenalectomy ameliorates pancreoprive(4) and alloxan diabetes(5) and may benefit dehydroascorbic acid diabetes.

Experimental. Male Sprague-Dawley rats of 110-180 g were injected with 0.2 g per kilo of dehydroascorbic acid followed in 10-30 minutes by 0.8 g per kilo on each of 3 consecutive days. The course of the diabetes was estimated from weekly blood sugar determinations. All the rats used in this experiment developed stabilized diabetes of at least 10 weeks duration. The food and water intake, the urine volume and the urine sugar output (6) were determined for 5 consecutive days and the average blood sugar was obtained by averaging 5 consecutive weekly determinations. Following adrenalectomy the animals were maintained on a 0.8% sodium chloride solution instead of water(4) and again studied as before for 5 consecutive days. A group of non-operated dehydroascorbic acid diabetic rats were maintained on water and then on 0.8% sodium chloride. The administration of salt (Fig. 1) increased the glucosuria, polyuria, polydipsia, and polyphagia, but decreased the hyperglycemia. Following adrenalectomy, however, the hyperglycemia was reduced and the other signs of diabetes were also ameliorated. P values were calculated in two different ways. First, the standard deviations for the various criteria before and after adrenalectomy were compared. Secondly, each criterion was analyzed by comparing the standard deviation of the change produced in switching from water to sodium chloride solution in the adrenalectomized group with the standard deviation of the corresponding change produced in the non-operated group. The P values are shown in Fig. 1 and indicate

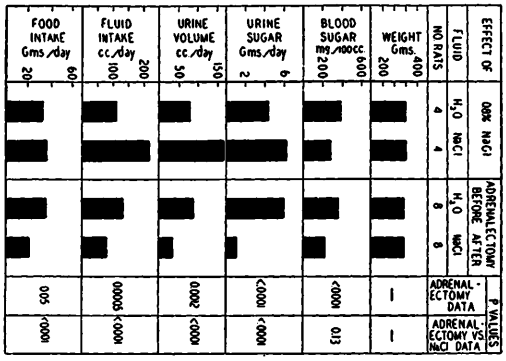

FIG. 1. Effect of adrenalectomy on dehydroascorbic acid diabetes.

that the amelioration resulting from adrenalectomy is statistically significant.

Discussion. The changes produced by the administration of salt are in agreement with earlier work(7). Following adrenalectomy the changes in the diabetic signs are the reverse of those produced by high salt intake in non-operated rats, except that the blood sugar falls even lower following adrenalectomy. Glucosuria, polyuria, polydipsia, and polyphagia are all ameliorated by adrenalectomy in spite of a high salt intake. These results are similar to those obtained after adrenalectomy in pancreatectomized(4) or alloxan injected(5) rats and are consistent with the concept that dehydroascorbic acid diabetes is a pancreatic form of the disease.

Summary. Dehydroascorbic acid diabetes in rats is ameliorated by bilateral adrenalectomy.

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