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Tubular Resorption of Chloride in Hypertensive and in Normal Individuals.

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By comparison of the U P chloride ratio in terms of the U P inulin, we have attempted to obtain information concerning the behavior of the renal tubules toward chloride of patients with "essential hypertension."

Methods. The experimental series consists of 38 periods determined upon 10 patients with essential arterial hypertension; in the control group 12 normal individuals furnished a total of 34 periods. The tests were performed in the morning, in the fasting state. The usual technic for the inulin clearance was employed, 3 periods of 15 to 30 min being taken. Urine specimens were collected by catheterization and rinsing of the bladder with sterile water. The blood for the chloride determinations was taken under oil, and estimations were done on serum and quoted in terms of sodium chloride. Analysis for chloride concentration was done by the method of Sendroy.[1] Determinations of inulin were carried out by the method of Corcoran and Page.[2]

Results. The renal tubules in hypertension were found to reabsorb significantly less chloride in relation to the U/P inulin than did those of normal subjects.

Discussion. The patients included in the experimental series were for the most part in the younger age groups, and bore the clinical designation of "essential hypertension." Those in whom the inulin and diodrast clearance suggested a definite renal involvement were also excluded. In this way it was hoped that the results would not be confused by ancient or generalized infectious or degenerative processes and would therefore represent as specifically as possible the functional patterns of uncomplicated hypertension.

The normal subjects were drawn chiefly from the gynecological service and included younger women who were suffering from relatively minor complaints without renal or vascular implications. The tests were performed either prior to surgery or several weeks post-operatively, at such time as recovery was complete and the patients were ambulatory. All subjects were on the general diet, and all were similarly hydrated in preparation for the test. Differences in previous chloride intake were therefore dependent only upon personal variation and were presumably inconspicuous. In general, then, it seems justified to assume conditions of chloride equilibrium.

Whether the observed differences are to be interpreted as indicating specific changes in the tubular cells with respect to permeability toward chloride, increased velocity of tubular urine flow, or even a hormonal influence, the present data do not enable us to determine. Further studies are therefore under way which may further clarify the problem.

Summary. The clearance of chloride was studied simultaneously with that of inulin in hypertensive and in normal individuals under standard conditions of mineral intake and hydration. The cases investigated showed no evidence of urinary tract or other pathology to which an etiological relationship might be attributed. The hypertensive subject is demonstrated to reabsorb chloride to a substantially lesser extent than does the normal subject when compared in terms of the U/P inulin ratio.

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1 Sendroy, J., *J. Biol. Chem.*, 1937, **120**, 2.

2 Corcoran, A. C., and Page, I. H., *J. Biol. Chem.*, 1939, **127**, 601.

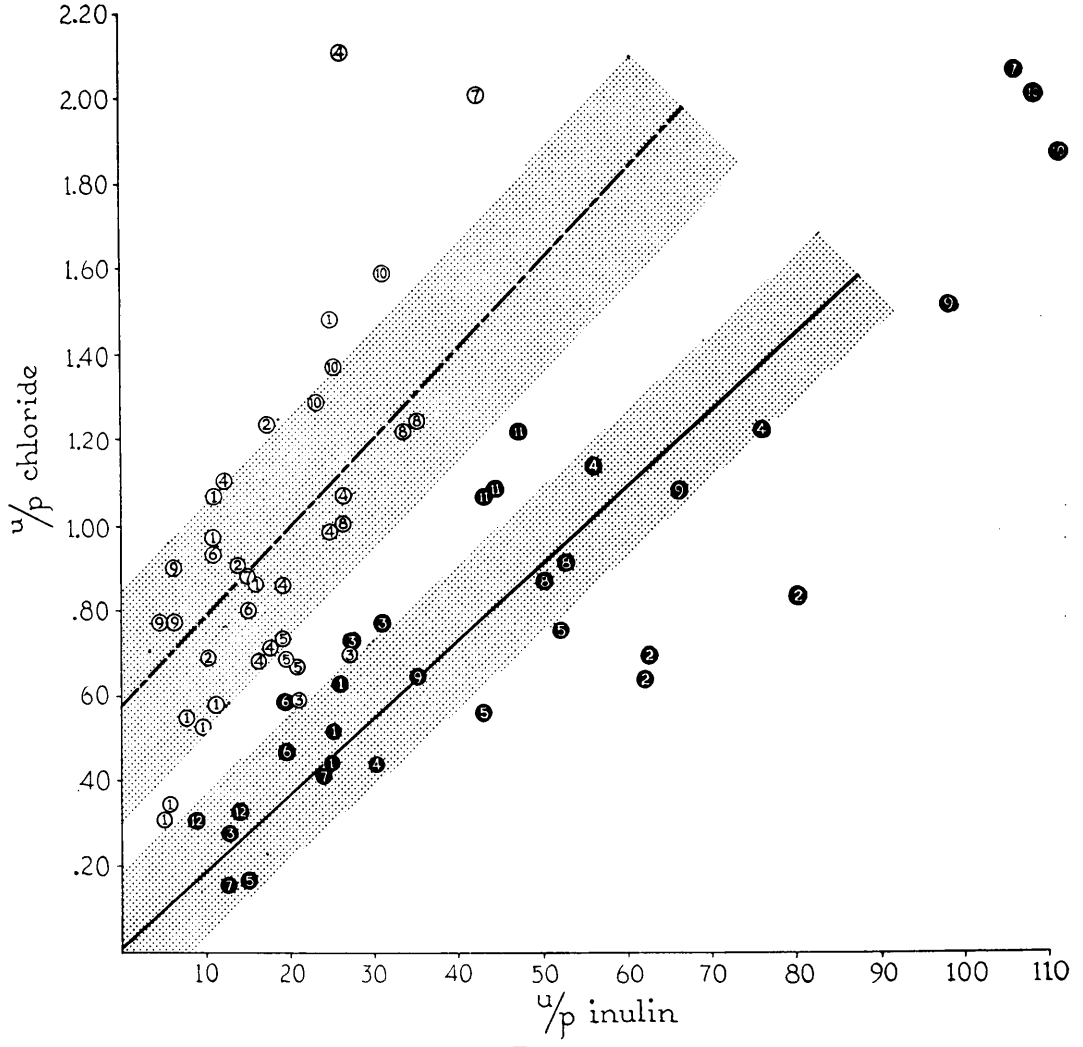

FIG. 1.

U/P Chloride in Terms of U/P Inulin.

Black symbols represent normal subjects; white symbols represent subjects with essential arterial hypertension. Symbols containing the same number indicate clearance periods determined for the same individual.

* The coefficient of linear correlation for the normal group is, $r = 0.964$ with a probable error of ± 0.0082.

The coefficient of linear correlation for the hypertensive group is, $r = 0.683$ with a probable error of ± 0.058.