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Nonglucose Reducing Substances in Hypertension.

HAROLD JOSEPH AND LOUIS TOBIAN, JR.* (Introduced by T. R. Harrison.)
From the Department of Internal Medicine, Southwestern Medical College, Dallas, Texas.

Although the blood of nonuremic patients with essential hypertension has shown few chemical abnormalities, there have been reports of increased nonglucose reducing substances.[1] Since these nonglucose reducing substances could conceivably have a blood pressure raising effect, they were determined in the whole blood and plasma of normal and hypertensive individuals.

Procedure. The blood pressures were taken by the usual cuff method, the diastolic pressure being that point at which the pulse sound disappeared, as recommended by Steele.[2]

Blood was drawn under fasting conditions into bottles containing sodium citrate, and the determinations were made immediately.

The analytical method employed was a modification of Somogyi's method for the determination of reducing nonsugars in blood.[3] Glucose was removed by washed baker's starch-free yeast prepared according to Somogyi.[3] Sodium hydroxide and zinc sulfate were used to precipitate the protein in whole blood.[4] Colorimetric determinations were made according to Somogyi,[4] using his new alkaline copper reagent[5] and Nelson's arsenomolybdate reagent.[6] A glucose standard was analyzed with each determination. All samples were read on an Evelyn colorimeter, using the 660 Evelyn filter.

The nonglucose reducing substances were also determined in plasma by an identical

TABLE I.
Observations on Protein-free Filtrates of Whole Blood and Plasma of Normal and Hypertensive Subjects.

	No. of samples	Range of blood pressures (mm Hg)	Mean of blood pressures (mm Hg)	Mean of nonglucose reducing substances estimated as glucose mg %	S.E. of means	Diff. in means / S.E. of diff. in means
A. Whole blood:						
Normal	19	138-98 / 80-48	106 / 63	4.14	.399	1.07
Hypertensive	20	250-142 / 128-96	181 / 107	4.87	.555	(P = .28)
B. Plasma:						
Normal	10	138-100 / 80-60	119 / 73	1.46	.312	.36
Hypertensive	11	240-142 / 118-98	182 / 109	1.76	.269	(P = .72)

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1 Holden, Raymond, F., Jr., *J. Clin. Invest.*, 1944, **23**, 859.

2 Steele, J. M., *J. Mt. Sinai Hosp.*, 1942, **8**, 1042.

3 Somogyi, Michael, *J. Biol. Chem.*, 1927, **75**, 33.

4 Somogyi, Michael, *J. Biol. Chem.*, 1945, **160**, 69.

5 Somogyi, Michael, *J. Biol. Chem.*, 1945, **160**, 61.

6 Nelson, Norton, *J. Biol. Chem.*, 1944, **153**, 375.

method except that barium hydroxide was substituted for sodium hydroxide in the protein precipitation.[4]

Values for nonfermentable reducing substance have been expressed in terms of glucose-equivalents and have, therefore, only relative significance.

Results. The results of whole blood and plasma determinations of nonglucose reducing substances are shown in Table I, as well as the standard error of their means. The difference between the levels of nonglucose reducing substances of normal and hypertensive subjects, when subjected to statistical analysis, cannot be regarded as significant. The variance between our results and those of Holden[1] can possibly be accounted for by the fact that he was using Somogyi's earlier copper reagent which employs a carbonate-bicarbonate buffer mixture and contains KI. The reagent we used contains a phosphate buffer system and no KI.

Summary and Conclusions. The nonglucose reducing substances remaining after a Somogyi protein precipitation[4] were determined in blood and plasma.

The blood or plasma concentration of these nonglucose reducing substances was not significantly different in hypertensive subjects as compared to normals.

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Effect of Adrenal Cortical Extract in Hypertensive Subjects.*

KERMIT L. PINES, GEORGE A. PERERA, KATHERINE VISLOCKY, AND ANN D. BARROWS.

From the Department of Medicine, Columbia University College of Physicians and Surgeons, and the Presbyterian Hospital, New York City.

Following studies on the pressor activity of desoxycorticosterone acetate,[1] suppression of adrenal cortical function was considered as a possible means of decreasing the blood pressure in essential hypertension. Observations were therefore undertaken on the effects of prolonged administration of an adrenal cortical extract on the arterial tension, circulatory physiology, electrolyte and fluid balance of patients with this disorder.

Methods. Four women with uncomplicated hypertensive vascular disease were studied on the metabolism ward of the Presbyterian Hospital. The criteria in selection of patients and the methods employed were identical to those previously described.[2] All subjects were maintained on a constant dietary fluid and sodium chloride intake and were afebrile throughout the experiment. Following a 3-week baseline period, adrenal cortical extract (Upjohn) was administered intramuscularly in 10 cc doses twice daily for 20 days; then, in 3 patients, 3 times daily for an additional 10 days. The remaining patient (No. 3) developed a moderately severe headache after 6 days on the increased dosage so that the schedule of 2 injections was resumed for 9 additional days. During the final week of the preliminary period and for one week after the extract was discontinued, each patient received intramuscular injections of glucose in distilled water or of 10% alcohol twice daily as well as the advice that this medication was producing a beneficial effect.

Results. Slight weight gain relative to the baseline trend appeared during the period of adrenal cortical extract administration in all instances, together with minimal evidence of salt and water retention. In 3 subjects a decrease in "resting"[2] blood pressure was observed, with a rapid return to baseline values

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1 Perera, G. A., and Blood, D. W., *Ann. Int. Med.*, 1947, **27**, 401.

2 Perera, G. A., and Blood, D. W., *J. Clin. Invest.*, 1947, **26**, 1109.