

The Serum Uric Acid Concentration in Essential Hypertension.*

JOSEPH R. STANTON AND EDWARD D. FREIS. (Introduced by Robert W. Wilkins.)

From the Evans Memorial, the Surgical and Medical Services, Massachusetts Memorial Hospitals, and the Departments of Surgery and Medicine, Boston University School of Medicine.

The blood uric acid concentration in patients with arterial hypertension has not received careful attention since early investigators reported the uric acid level to be increased.¹⁻⁴ This reported increase was ascribed to metabolic factors and not to beginning renal insufficiency.³ More recent work on methods for the determination of the serum concentration of uric acid indicated that values determined by earlier methods contained many sources of potential error.⁵⁻⁸ Further, many of the subjects previously studied had varying degrees of cardiac and renal failure.

If there is a metabolic fault in essential hypertension that results in hyperuricemia it would be of importance as a lead to further investigation. However, it was considered necessary first to reevaluate the question using modern methods of analysis and paying particular heed to the presence of renal insufficiency.

Material and Method. Fifty consecutive hypertensive patients admitted to the Ward and Private services of the Massachusetts Memorial Hospitals for lumbo-dorsal splanchnicectomy were the subjects of this study (c. f. Table I). Chronic glomerulonephritis and other forms of primary renal disease were

TABLE I.

	No. of cases
Males	20
Females	30
Age group	
20-30	4
30-40	13
40-50	19
50-60	13
60-70	1
Systolic blood pressure over 180 mm Hg.	42
Diastolic blood pressure over 100 mm Hg.	48
Proteinuria	20
Nitrogen retention	2

adequately ruled out by history and laboratory examinations.

Hypertension had been known to exist in these patients for from 6 months to 20 years. The highest blood pressure recorded on admission was 250/160, the lowest 160/96. Only one patient was in cardiac failure during the period of observation.

The determination of uric acid was carried out by the method of Folin,⁷ adapted to the Klett Summerson photoelectric colorimeter† using a protein free filtrate of serum.⁹ Blood samples from all patients in this series were taken in the post-absorptive state. Normal values obtained by this method ranged from 2.5 mg/100 cc of serum.

Results. Persistent hyperuricemia was demonstrated in only 2 cases or 4% of the series. Normal serum uric acid levels were found on the initial determination in 44 cases. Six cases exhibited a serum uric acid level above 5 mg % at the time of the initial determination. On repeat examination carried out 24 to 48 hours later, 4 of these 6 cases were found to have uric acid levels well within the normal

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¹ Kylin, E., *Acta med. Scandinav.*, 1923, **58**, 342.

² Hitzemberger, K., Richter and Quinter, M., *Wien. Arch. f. inn. Med.*, 1921, **2**, 189.

³ Fishberg, A. M., *Arch. Int. Med.*, 1924, **34**, 503.

⁴ Williams, J. L., *Arch. Int. Med.*, 1921, **27**, 748.

⁵ Wu, H., *J. Biol. Chem.*, 1922, **51**, 21.

⁶ Folin, O., *J. Biol. Chem.*, 1934, **106**, 311.

⁷ Folin, O., *J. Biol. Chem.*, 1933, **101**, 111.

⁸ Dana, E. S., Bosnes, R. W., and Dill, L. V., *J. Clin. Invest.*, 1944, **23**, 776.

† General Directions for the Klett Summerson Colorimeter, Klett Mfg. Co., New York.

⁹ Folin, O., and Wu, H., *J. Biol. Chem.*, 1919, **38**, 81.

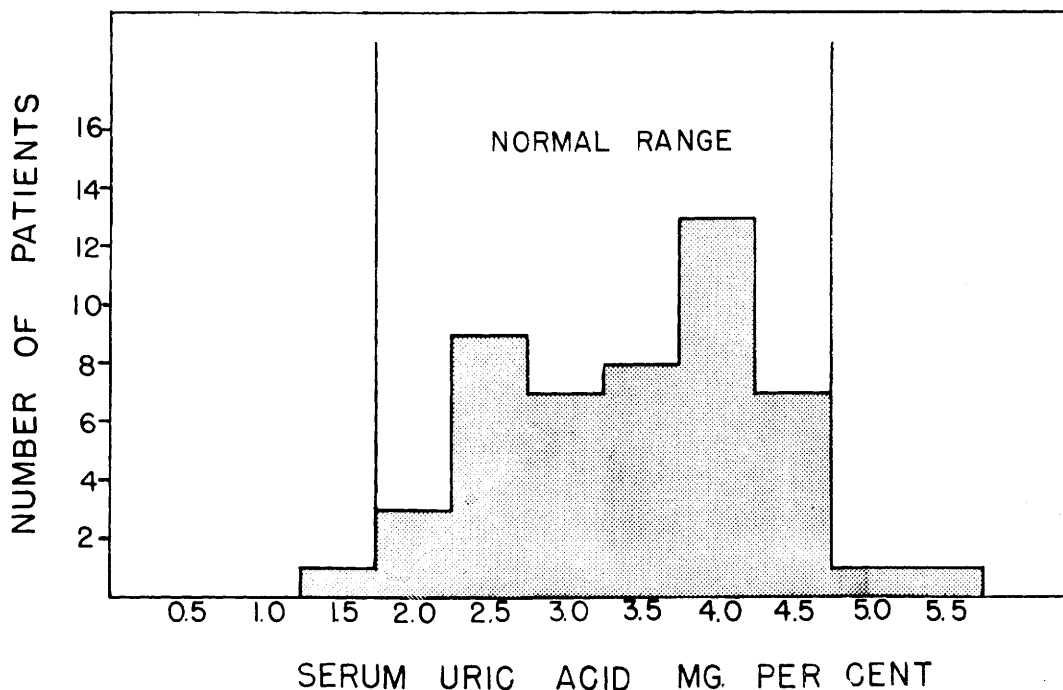


FIG. 1.

Serum uric acid concentration of 50 patients with essential hypertension.

range. The mean serum uric acid level for the entire series was 3.65 mg % with a standard deviation of 0.88 (Fig. 1).

Discussion. It is significant that the 2 cases with persistent hyperuricemia showed evidence of renal insufficiency as manifested by elevation of the blood non-protein-nitrogen. Proteinuria was present in both of these cases and also in 3 of the 4 cases showing transient hyperuricemia. However, hypertension and proteinuria were observed in 12 patients showing normal uric acid levels. Therefore, no

consistent relationship was observed between proteinuria and elevated serum uric acid levels. The transient elevations of serum uric acid concentration observed in four cases were slight, none exceeding 5.5 mg %.

Summary and Conclusions. In a series of 50 cases essential hypertension, unless complicated by renal insufficiency, was associated with essentially normal serum uric acid values.

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