Acute and Subacute Glomerulonephritis Modified by Adrenocorticotropin.* (17808)

EDITH B. FARNSWORTH. (Introduced by C. J. Farmer.)

From the Department of Medicine, Northwestern University Medical School.

The data compromising this preliminary report were collected for the purpose of investigating the acute or subacute phases of glomerulonephritis under the influence of adrenocorticotropin. Attention was directed less toward phenomena associated with water and electrolyte metabolism than those associated with inflammation and with azotemia. In view of the transitory character of acute glomerulonephritis in children, with or without therapy of any sort, patients were selected in whom the disease was of long duration.

The first patient, R. L., was a 12-year-old girl who had been treated for subacute glomerulonephritis and rheumatic heart disease at Children's Memorial Hospital, for 6 weeks. Gross hematuria, azotemia and hypertension had been present throughout that period.

When admitted to Passavant Hospital, the urine was claret-colored and the 24-hour output contained an average of 7 g of protein. There was a loud apical systolic murmur; the blood pressure was 152/110 and the blood urea was 54 mg/100 cc. The erythrocyte count was 3,500,000 and the hemoglobin was 6.7 g%. Since there was no evidence of edema, she was given a general diet, without salt restriction. She was started on small doses of ACTH, totalling 27 mg daily, Armour standard. Even at this dose, the blood pressure rose abruptly, and after the fourth day the medication was discontinued for 2 days. Started again, the blood pressure appeared to be favorably affected, and the total dose was raised to 50 mg daily. Notwithstanding the fluctuations of pressure, the hematuria diminished after the second day of treatment, and by the fifth day, the urine was straw-colored. Microscopic examination of the centrifuged passed specimen, several days later, showed only an occasional erythrocyte.

There has been no reccurrence of hematuria. The blood pressure, blood chemistries, body weight, urine protein in g/24 hr are given in Fig. 1, along with the system of ACTH administration. The patient was discharged from the hospital on June 28; daily injections of ACTH, 25 mg, were given to her as an outpatient for the following month.

The second patient, C. D., was a 9-year-old girl who was admitted to Passavant Hospital with a history of rheumatic heart disease and subacute glomerulonephritis of 5 months' duration. The systolic blood pressure ranged from 176 to 188, the diastolic from 90 to 110. There was a loud systolic murmur, best heard at the apex, and a marked pulsus alternans. The erythrocyte count was 2,970,000, the hemoglobin 7.7 g, the leucocyte count 7,150. The urine was grossly bloody and contained 3.4 g of protein in 24 hours. The blood urea nitrogen was 73, the non-protein nitrogen 144 mg%; the serum cholesterol was 361 mg; creatinine 3.0 mg; total protein 5.5, albumin 2.9 g%.

After four days of control studies, ACTH was administered in doses of 20 mg, every 4 hours. By the fifth day of treatment the urine was straw-colored and microscopic examination of the morning specimen showed only an occasional erythrocyte. The diastolic blood pressure averaged 22 mm lower during this interval than during the control period. Adrenocorticotropin was then discontinued for the subsequent 5 days, at the end of which the urine had again turned dark red and the centrifuged specimen was found to be packed with erythrocytes. A second course of ACTH was associated with the disappearance of red cells, as was the first. This patient was studied for 35 days, with varying doses of ACTH. Upon discharge from the hospital the blood urea nitrogen was 42 mg/100 cc,

* This study was aided by a grant from U. S. Public Health Division of Research Grants and Fellowships.

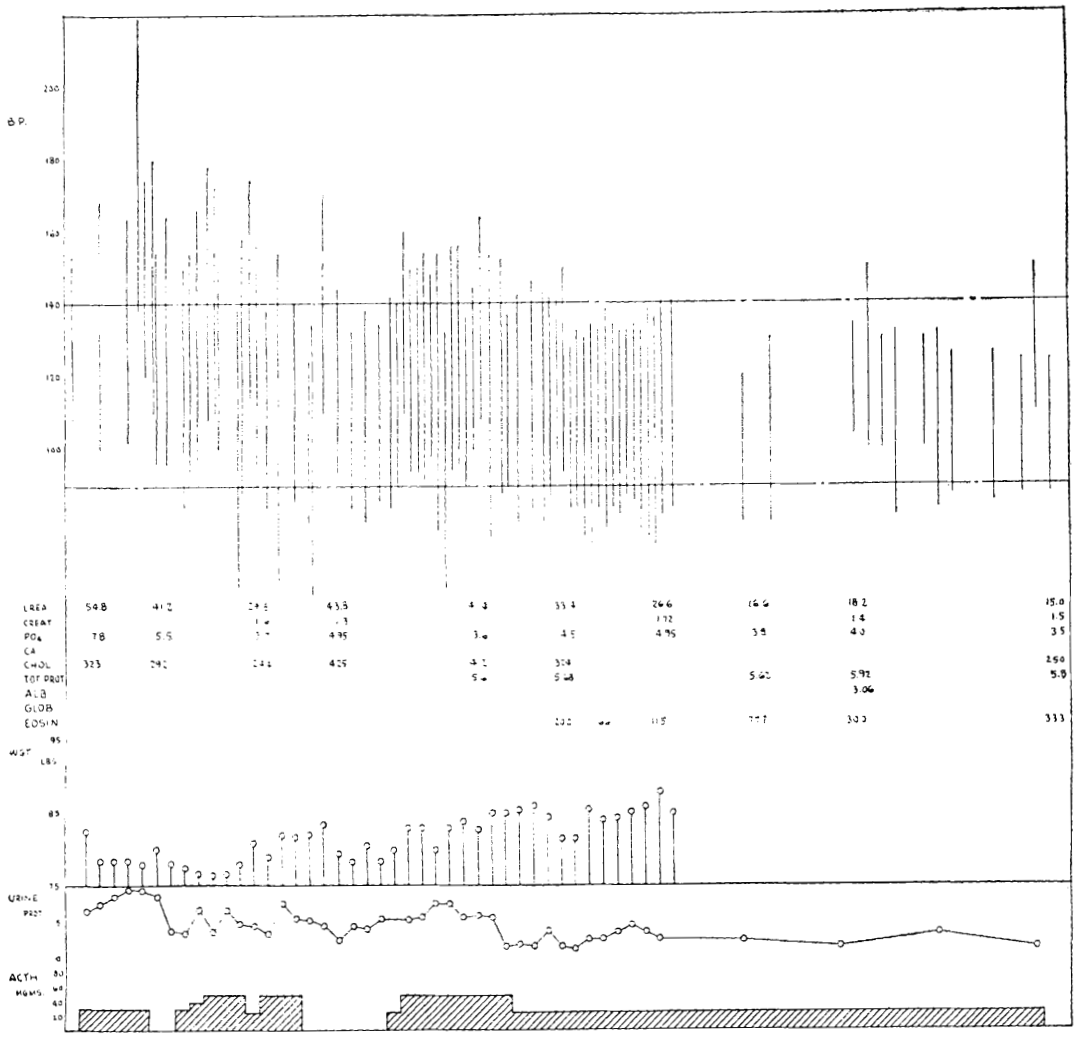

FIG. 1.
Administration of ACTH in subacute glomerulonephritis.

the creatinine 1.8; the serum cholesterol was 205 mg/100 cc. Follow-up studies 7 weeks after discharge indicate that the diastolic blood pressure remained below 90 mm. The non-protein nitrogen was found to be 44 mg/100 cc. The erythrocyte count was 4,080,000, the hemoglobin 10.5 g. Hematuria redeveloped soon after the patient returned home, and has remained present in varying degree.

The third patient was a 5-year-old girl, C. H., who was hospitalized at Children's Memorial Hospital with acute glomerulonephritis of several weeks' duration. Edema had been present on admission but had subsided soon after. The blood urea nitrogen was moderately elevated. The urine was smoky and loaded with erythrocytes. The volume was small and the concentration of protein was high. This patient was given 10 mg of ACTH every 6 hours. The eosinophils disappeared from the circulating blood, and by the fifth day the smoky urine turned straw-colored. The blood urea nitrogen came down from 28 to 15 mg/100 cc, rose to 22 mg% after 10 days of withdrawal, and returned to normal when medication was restarted. Fig. 2 shows the system of ad-

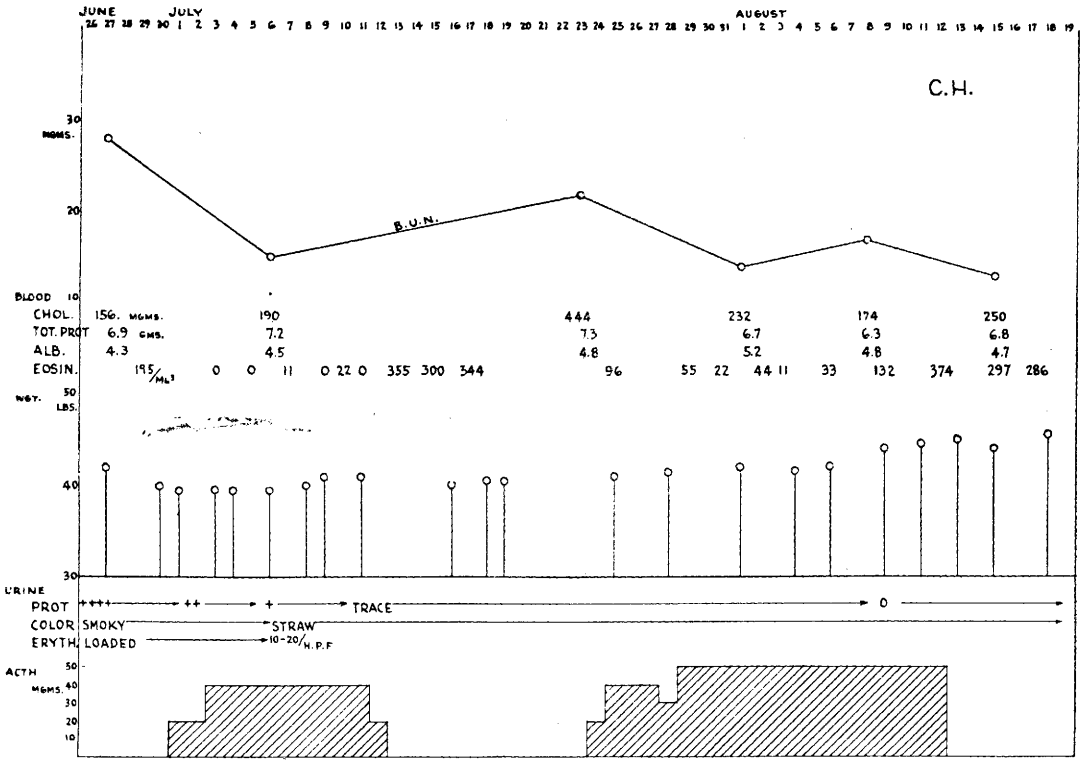

FIG. 2.
Administration of ACTH in acute glomerulonephritis.

ministration, along with the principal blood chemistries, the body weight and the urine characteristics.

Summary, results and conclusions. Two patients with subacute glomerulonephritis and one associated with rheumatic heart disease, with acute glomerulonephritis, were treated with adrenocorticotropin. In the first 2 cases hematuria was abolished or reduced to an occasional erythrocyte in the passed specimen. Azotemia and hypertension were reduced. In the second patient the improvement in blood pressure and nitrogen retention was maintained for the 7 weeks elapsing since the experimental period; however, hematuria recurred shortly after the discontinuation of treatment. In the first, follow-up studies performed 8 months after treatment showed a normal blood pressure, absence of blood in the urine but a slight increase in the blood urea and non-protein nitrogen.

Because of the relatively short duration of the disease in the third patient, less significance is attributed to the abatement after administration of ACTH.

It is concluded that hematuria, azotemia and hypertension associated with the active phases of glomerulonephritis can be favorably modified by activation of the adrenal cortex with ACTH.

Adrenocorticotropin was furnished through the courtesy of Dr. John R. Mote of Armour Laboratories.

Received March 16, 1950. P.S.E.B.M., 1950, v74.