Thyroxine-Binding Prealbumin in Thyrotoxicosis and Hypothyroidism

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The serum concentrations of thyroxine-binding prealbumin (TBPA) have been determined quantitatively by an immunochemical method in patients with thyrotoxicosis and hypothyroidism. Low levels of TBPA were found in all patients with untreated thyrotoxicosis. Normal values were found in 8 of 10 cases of untreated hypothyroidism.

Thyroxine is reversibly bound in the plasma to three proteins: thyroxine-binding globulin (TBG), thyroxine-binding prealbumin (TBPA), and albumin. Changes in the binding capacities of TBG and TBPA in patients with thyroid disease have been reported previously (1, 2). Since starch-gel electrophoresis of serums of patients with thyrotoxicosis indicated a marked decrease in density of the stain in the zone of prealbumin, it was suggested that the diminished TBPA capacity in these patients was due to reduction of prealbumin concentration (1). However, no data are available indicating the actual concentration of these proteins in the serum.

In the present study, the serum concentration of TBPA in patients with thyrotoxicosis and hypothyroidism has been determined quantitatively by an immunochemical method.

Materials and Method

Clinical Material

Control serums were obtained from 84 healthy volunteers (42 men, 42 women) with ages ranging from 20 to 45 years. A total of 31 patients with untreated thyroid disease (21 with hyperthyroidism and 10 with hypothyroidism) were studied. All patients had moderate or severe clinical pictures, and patients with mild thyrotoxicosis or hypothyroidism were not included in this study. Serums were kept frozen until used.

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Determination of TBPA

Serum TBPA concentrations were determined quantitatively by single radial immunodiffusion on cellulose acetate strips (3). The specific anti-TBPA serum (Behringwerke, Marburg/Lahn, Germany) was diluted 1:6. Calibration curves were obtained by using a standard human serum with known concentration of TBPA (Behringwerke, Op. No. 166).

Results and Discussion

The mean TBPA concentration for 84 healthy adults was 26.6 ± 4.02 (S.D.) mg/100 ml of serum (Fig. 1). These values are slightly higher than those we had reported before (20 mg/100 ml) in a smaller group of subjects (4), and more closely approximate the values recently reported by Becker et al. (5)—25 mg/100 ml, with a wider range from 10 to 40 mg. The serum concentrations of TBPA were substantially lower in patients with thyrotoxicosis—14.6 ± 4.95 mg/100 ml. No consistent deviations from normal were found in 8 of 10 patients with untreated hypothyroidism (Fig. 1).

These findings indicate that the diminished TBPA binding capacity in thyrotoxicosis (1, 2), as previously reported in other physiologic and pathologic conditions (4, 6), is due to diminished TBPA concentration. Although all patients with thyrotoxicosis examined in this study...
had low values of TBPA, a relationship between the severity of illness and TBPA level could not be substantiated. However, TBPA values returned to normal after antithyroidal treatment. At present, it is difficult to assess whether the dosage of TBPA has a higher clinical interest than that of other thyroxine-binding proteins.

References