Scintigram and CT image in Thyroid test

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In this report more diagnostic information of thyroid disease were obtained by a combination of the scintigram, using I-131 and TI-201, and CT image.

The CT images were obtained by EMI scaner 5005/12 and the scintigrams were by Nunclear Chicago Pho/gamma Hp.

Tl-201 was concentrated in the scintigram to the tumor in thyroid cancer, some benign tumor and chronic thyroiditis with the nodule.

The thyroid image of CT scan in chronic thyroiditis was less appeared than in normal thyroid.

The thyroid images of CT scan were not clear in hyperthyroidism, subacute thyroiditis and Plummer's disease.

In normal thyroid EMI numbers were 29.41-62.01 and those of hyperthyroidism were lower than those of normal thyroid.

EMI numbers in struma cystica were lower than struma nodosa.

Using scintigram by I-131 and T1-201, and CT image in thryoid function test were valuable in diagnosis.

Abnormalities in Thyroid Hormone Concentration by Radioimmunoassay due to Anti-Thyroxine and Anti-Triiodothyronine Autoantibodies

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Antibodies against thyroxine (T_4) and/or triiodothyronine (T_3) were detected in five patients with Hashimoto's disease, including one with anti-T_4 antibody (Case 1), three with anti-T_3 antibody (Cases 3–5) and one with both antibodies (Case 2). Serum T_4 values by a single antibody radioimmunoassay (RIA) were significantly lower than those by competitive protein binding assay in Cases 1 and 2.

In cases with anti-T! antibody, serum T_3 values by a single antibody RIA were low or zero. Upon extraction of these sera with ethanol, high or normal amount of T_3 were obtained.

Recovery of T_4 or T_3 added to the patients' sera determined by RIA was significantly low. The binding of ^{125}I-T_4 or ^{125}I-T_3 to the patients' sera was demonstrated by polyethylene glycol method and by using RIA kits without adding provided antibody. The binding activity was localized in the IgG fraction by column chromatography and immunoprecipitation. T_4 or T_3-binding protein in Cases 1, 2 and 5 migrated in the gammaglobulin region on paperelectrophoresis and was found in 7S fraction on Sephadex G-200 chromatography. The association constant (Ka) and binding capacity of anti-T_4 antibody in Cases 1 and 2 were 1.9×10^8 M^{-1}, 0.8 μg/100m*l* and 3.8×10^8 M^{-1}, 8.2 μg/100m*l*, respectively. Ka for anti-T_3 antibody in Cases 2, 3 and 5 were 1.7×10^8, 5.5×10^8 and 7.4×10^{10} M^{-1} and binding capacities were 1.9, 0.6 and 0.7 μg/100m*l* respectively.

Misleading low RIA values in these cases were considered to be caused by the increase of the binding capacity in RIA system due to these antibodies.

Presence of these hormone binding antibodies should be kept in mind to avoid erroneous clinical

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interpretation of the values obtained by RIA.

Possible relation of anti-T_3 antibody in Case 5 to latent hypothyroid state of this patient was also discussed.

Comparison of TSH Receptor Assays

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There have been reported two representative methods for TSH receptor assays by Amir et al. (J.B.C., 1973) and by Smith et al. (FEBS Letters, 1974) after Manley (J. Endocr., 1974). However, these two methods are quite different from each other in both assay conditions and results of assays on the sensitivity to cold TSH and on the effects of IgGs from patients with Graves' disease. In order to observe what factor was the most responsible for these discrepancies between the two methods, this study was performed using the preparations prepared as described in the original reports from the same materials (e.g. receptor, tracer, cold hormone, IgG). Under the original condition, the displacement of ^{125}I-TSH by the cold TSH was as sensitive as that in the original report in each assay. Many IgGs from the patients with Graves' disease showed stronger displacements than those from normals in Smith's method. However, both IgGs displaced the ^{125}I-TSH to the same extents in Amir's method despite of the use of same IgG preparations. Any alterations of incubation temperature, incubation time and pH resulted in decrease in binding and sensitivity in each assay. The degradation of ^{125}I-TSH during incubation or the amount of solubilized receptors in the incubation medium was negligible in both methods. Substitution of one receptor for another did not influence the results in each assay. Similary, substitution of Smith's tracer for Amir's did not change the sensitivity or IgG's effect in Amir's assay. These results suggest that either methods to prepare receptors or degradations of labelled TSH are not responsible for the differences between the two assays. The combination of purified tracer and incubation conditions seems to be important to increase the sensitivity of TSH receptor assays.

Studies on the Radioreceptor Assay of TSH —TBII in Patients Treated with Radioiodide for Hyperthyroidisim—

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By using the radioreceptor assay of TSH, some IgG from patients with Graves' disease have been shown to inhibit the binding of labelled TSH to its receptor sites. These IgG, called TSH-binding inhibitor immunoglobulins (TBII), were detected in 60% of untreated Graves' patients. In this study TBII were measured in 51 patients who had been treated with radioiodide (^{131}I, 4–10 mCi) 4 to 17 years before.

The incidence of TBII was 20%. In still thyrotoxic patients (10 cases) TBII were detected more frequently (80%) and LATS activity was positive in 20%. However, the incidence of TBII in hypothyroid (12 cases)or euthyroid (29 cases) patients were very low of 5%. Furthermore the activities of TBII in these patients were not so potent as in thyrotoxic patients. This result may indicate that the measurement of TBII in patients treated with radioiodide is useful for checking the results of treatment.

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