

Dynamic Thyroid Study Using Na ^{131}I and Perchlorate

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The Perchlorate Discharge Test was used in the detection of thyroidal synthetic disorder.

We observed serial thyroidal images and radioactivity change with the VTR on line system, in which -camera was connected directly with the videotape recorder.

We tried to approach to the patho-physiology of thyroidal diseases. Patients were administered 100 Ci of Na ^{131}I p.o. and thyroidal activity was measured 24 hr later, and at that time 150 ml of 0.1% KClO_4 was administered p.o. and the discharge pattern was recorded on VTR from 10 min. to 60 min. after the administration of KClO_4 . On play back we observed serial ^{131}I radioactivity change in all lobes of thyroid image and particularly the region of interest settled on a cold area of thyroid image.

The researched cases consisted of 2 normal cases, 4 cases of Hashimoto's thyroiditis, 2 cases of Basedow's diseases, one case of single goiter and 2 cases of thyroid cancer.

In the normal and Basedow's disease cases, no radioactivity change was observed after 60 min. of KClO_4 administration.

This phenomenon indicated that the administered ^{131}I was almost all organized. The cases of Hashimoto's thyroiditis showed the discharge value of 8–12% in all lobes of the thyroid gland following the administration of perchlorate.

Particularly the discharge of the hot area showed a marked value of 23–34%. In cases of Hashimoto's disease, although symptoms and signs have subsided, high discharge from the thyroid gland still remained. Therefore it was thought that the biosynthetic function was not still recovered. However, in cases of simple goiter, even in cases that were not treated, the discharge value was not as high as in Hashimoto's disease. Moreover the degree of the biosynthetic disorder of thyroid cancer depends on its histological findings.

Clinical Evaluation of Thyroid-lymphography by Using $^{99\text{m}}\text{Tc}$ -Colloid

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Radioisotopical thyroid lymphography was performed on 30 cases with various thyroid disorders using $^{99\text{m}}\text{Tc}$ -Colloid and PHO/Gamma scintillation camera.

Following percutaneous injection of 0.5 mCi/

less than 0.2 ml aliquots of $^{99\text{m}}\text{Tc}$ -Colloid into the center part of both thyroid lobes, a pinhole collimator with scintillation camera was placed at 15 cm distance from neck surface, and the radioactivity counting and scintiphotography

were performed immediately and at 20 and 60 min. after injection.

Scintiphotos obtained at 1 hour were considerably different from case to case and were divided into 5 types according to the grade of diffusion and lymph node visualization. In Types 0 and I no lymph node was visualized. Type II to IV showed visual lymph nodes in various degree and increasing numbers stood for marked lymph node activities.

Radioactivity at 1 hour also differed from unchanged to around 60% of the initial.

In the 0 there observed slow disappearances and rapid disappearances were observed in some but not all of graves' disease and chronic thyroiditis.

As to the Types of scintiphoto, there found rough correlation with size of goitre, and much closer correlation was observed between Types

and titers of circulating antibodies against thyroglobulin and/or thyroid microsomes.

Furthermore, untreated Graves' disease, Hashimoto's disease and all but one of chronic thyroiditis were found to show positive lymph node visualization, but none of the other disorders. Therefore this technique was considered to be an easy and useful way of detecting autoimmune abnormality related to the thyroid.

Exophthalmic cases were used to show dominant lymph node visualization and most of antithyroid drug treated cases were associated with decreased lymph node images. Of note, in one case with positive T_3 suppression no lymph node was visualized. These observation confirmed the significance of autoimmune mechanism in Graves' disease and further this technique was suggested to be useful for the determination of terminating chance of antithyroid drugtherapy.

Radiation Dose of the Liver in Patients of Hyperthyroidism Treated with ^{131}I

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It has been reported by Nicoloff et al. that the ^{131}I labeled thyroxine was much more incorporated into the liver in hyperthyroidism than in euthyroid. Authors found in some cases of hyperthyroidism that the liver accumulated an appreciable amount of ^{131}I after therapeutic administration. The hepatic incorporation of ^{131}I and its radiation dose therein were measured and estimated in 26 cases of hyperthyroidism treated with ^{131}I in the present study. Radioactivity in the hepatic region of patients were measured by a scintillation counter following ^{131}I administration. The hepatic ^{131}I incorporation in patients was estimated by comparing the results of radioactivity measurements in patients with the measurements made under the same geometrical condition as the patients on the

Alderson's phantom loaded with the known amount of ^{131}I (50–300 μCi). The hepatic radiation dose was calculated from the estimated hepatic radioactivity and effective half life in liver of each patient using the formula in the MIRD. The minimum hepatic ^{131}I incorporation was 36 μCi , the maximum 1170 μCi , and the average 320 μCi . The corresponding radiation doses were 2.7 rads in the minimum, 108 rads in the maximum, and 26 rads in the average. It was found that the hepatic ^{131}I incorporation and hepatic radiation doses were correlated with the administered doses of ^{131}I but that they were not correlated with the thyroid radiation doses.

The level of alkalinephosphatase in the serum of hyperthyroidism before the treatment with ^{131}I was higher than those of euthyroid and re-