Thyroid scintigraphy with $^{201}$Tl Chloride

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Thyroid scintigraphy with $^{201}$Tl chloride was performed in 25 patients who were scheduled to be operated on. $^{201}$Tl chloroide scintigraphy and histological findings of operated thyroid gland were investigated in this paper.

Thyroid diseases which were discussed in this series were 9 cases of papillary adenocarcinoma, one case of anaplastic carcinoma, one case of reticulosarcoma, 5 cases of follicular adenoma, 7 cases of benign cyst, one case of adenomatous goiter and 2 cases of Hashimoto’s thyroiditis.

Comparison study of uptake ratio of $^{201}$Tl chloride into the thyroid gland analysed by computed image between normal thyroid gland and thyroidal resion was investigated.

All cases of malignant goiter showed positive uptake ratio over than 1.2 even though diameter of the resion was less than 1 cm.

Two cases of papillary adenocarcinoma in which tumor was more than 3 cm in its diameter and one case of anaplastic carcinoma, more than 7 cm in its diameter were revealed high uptake ratio. On the other hand, low uptake ratio was observed in one case with huge reticulosarcoma of the thyroid gland.

In all 3 cases with bone and lymph node metastasis, positive uptake of $^{201}$Tl chloride was observed in the metastatic area.

In 3 out of 5 cases of follicular adenoma, $^{201}$Tl uptake was positive, but its ratio was less than 1.6.

In all cases with benign cyst, filling defects were observed in $^{201}$Tl chloride scintigraphy.

Diffuse and marked positive accumulation of $^{201}$Tl was observed in 2 cases with Hashimoto’s thyroiditis in subacute stage. This finding was quite different from that of nodular goiter.

Non-Gaussian Distribution of Free Thyroxine Index (Effective Thyroxine Ratio) and Serum Thyroxine Level in Euthyroid Subjects

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Simultaneous determinations of Effective T4 Ratio (ETR) and of T4 concentrations in serum were made in 6613 sera, using Res-O-Mat ETR test. The averages of 5080 euthyroid ETR and T4 values were $0.98 \pm 0.07$ (SD) and $8.1 \pm 2.6 \mu g/100 ml.$, respectively. Distinct elevations of ETR and T4 values were found in 988 hyperthroid sera (Mean±SD=1.24±0.13 in ETR and 17.4±4.2 \mu g/100ml. in T4), while these values were markedly diminished in 454 hypothyroid sera (Mean±SD=0.83±0.06 in ETR and 2.5±1.7 \mu g/100ml. in T4).

In order to use both ETR and T4 values as routine screening test for evaluation of thyroid function, it was necessary to define the euthyroid ranges of ETR and T4 values. The frequency distribution of ETR and T4 values for 5080 euthyroid sera was analyzed for normality by determining their skewness. The significant skewness was found in both ETR and T4 values ($+0.47$ in ETR and $+0.68$ in T4). Therefore, the mean±2 SD range did not define 95% of the euthyroid population.
and an alternative appropriate normal ranges had to be defined. Thus, the range of 0.87–1.10 was arbitrarily selected by inspections as the best euthyroid ETR range. By using this euthyroid range, the ETR values gave 97.1% accuracy in diagnosing hypothyroid, euthyroid and hyperthyroid subjects. Similarly, the euthyroid T4 range giving maximum discrimination between hypothyroid, euthyroid and hyperthyroid subjects was 4–13 μg/100 ml. The diagnostic accuracy was 91.6% in this range, because of including the patients with abnormal TBG capacities in euthyroid group. The results indicated that ETR values were the useful indicator of thyroid function and that it was possible to find out the patients with abnormal TBG capacities by means of determining T4 simultaneously.

**Serum Reverse-Triiodothyronine (r-T3) Level in the Aged**

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Serum level of triiodothyronine was reported to be decreased in some aged people. In order to elucidate the metabolism of thyroidal hormones, serum r-T3, T3, T4 and TSH levels were measured in both adult and aged people.

Materials and Methods: Serum r-T3, T3, T4 and TSH were measured in 16 aged extrathyroidal patients, from 66 y.o. to 91 y.o. (Group-II) and 9 normal subjects, from 27 y.o. to 48 y.o. (Group-I). The r-T3 was measured with RIA-kit of HYPO-laboratory. TSH and T3 were determined by RIA-method and T4 by CPBA-method.

Results: Serum T4 and T3 levels in Group-II (T4: 72±41 ng/ml, T3: 0.70±0.29 ng/ml) showed lower values than those in Group-I (T4:87±11 ng/ml, T3:1.41±0.15 ng/ml). On the other hand, serum r-T3 levels in Group-II (0.58±0.28 ng/ml) were significantly higher than those in Group-I (0.355±0.33 ng/ml). The r-T3/T3 ratio in Group-I (0.24±0.04) remained to be constant, while the r-T3/T3 ratio in Group-II (1.12±0.89) showed higher value on the average with large variation from case to case. In all patients of Group-I with serum r-T3 level more than 0.5 ng/ml, the serum T3 level remained less than 1.0 ng/ml. Ratio of r-T3/T4 in Group-I (0.00417±0.00068) were lower than those in Group-II (0.0098±0.004), and T3/T4 ratio in Group-I (0.0172±0.077) were higher than those in Group-II (0.0082±0.0058).

Conclusion and comments: Serum T3 and T4 levels in the aged patients showed lower values than those in normal adults. On the other hand, serum r-T3 level in the aged patients was remarkable higher than that in the normal adults. These facts might suggest that the metabolic degradation of T4 into r-T3 could be more dominant in the elderly people than control, while, in control, T4 could be predominantly metabolized in to T3. The effect of chromic illness in elderly patients upon thyroxine metabolism should be further evaluated.

**Determination of Tissue T3 and T4 Concentrations**

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Recently it has been demonstrated that conversion of T4 to T3 in the peripheral tissue plays an essential role in the biological effectiveness of thyroid hormone. It is, therefore, important to determine the tissue T3 and T4 concentrations for the study on the metabolism and the effects of