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THE CLINICAL SIGNIFICANCE IN FREE THYROXINE MEASUREMENT. Hitoshi Suzuki, Noriko Kanma, & Shin-ichi Shimoda. Dokkyo University, School of Medicine. Mibu, Tochigi.

By the use of free thyroxine(T₄) RIA kit (Damon), which comprised microcapsule containing I-125 T₄ bound anti-T₄ antibody, serum levels of free T₄ were measured in 55 patients with hyperthyroidism, 10 patients with primary hypothyroidism and 45 euthyroid subjects. Mean levels of free T₄ in three groups were 5.62 ± 0.37, 0.58 ± 0.10, and 1.5 ± 0.09 ng/100ml, respectively. The intraassay variation was 7.6 %. Significant correlation was found between free T₄ values and free T₄ indices (FT₄I) (r=0.846) or between two free T₄ kits (Damon & Spac; r=0.802). In hypothyroidism free T₄ level was gradually increased according to the T₄ supplement. In hyperthyroidism this abnormal free T₄ value was gradually decreased according to the PTU and iodide treatment, but serum T₄ or FT₄I was not so decreased for 2 to 4 weeks after initiation of therapy probably due to high TBG value. Therefore free T₄ measurement in treatment of hyperthyroidism was thought to be important in order to assess the exact thyroid status.

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THE RELATION BETWEEN SERUM CONCENTRATIONS OF FREE THYROXINE AND THYROXINE BINDING PROTEINS. S. Nagataki, N. Akimoto, T. Mitsuhashi, K. Kubota, N. Sasaki, S.C. Chiu, H. Uchimura and F. Matsuzaki. The Third Department of Internal Medicine, Faculty of Medicine, University of Tokyo, Tokyo.

Serum concentrations of thyroxine(T₄), triiodothyronine(T₃), thyrotropin(TSH), T₄-binding globulin(TBG) and free T₄(FT₄), values for T₃-uptake(T₃U), TBG-capacity(TBG-C), T₄-binding index(TBI) and %free T₄(%FT₄) were determined in Graves' disease(22), Hashimoto's disease(11), congenital TBG abnormalities (7), pregnancy (15), chronic hepatitis(10), liver cirrhosis(12) and patients with low T₃ syndrome(4). Then, FT₄ concentrations and various FT₄ indices i. e. 1) FT₄-DIA(T₄ × %FT₄ by dialysis), 2) FT₄-RIA (direct RIA), 3) FT₄-T₃U(T₄ × T₃-U), 4) FT₄-Mod.T₃U(T₄ × T₃U/100 - T₃U), 5) FT₄-TBI(T₄/TBI × 14), 6) FT₄-TBG(T₄/TBG), 7) FT₄-TBG-C (T₄/TBG-C), 8) FT₄-TBG-CT (T₄/TBG-C-T₄) were calculated in each patient.

Summary of the results were as follows:

	False Results	
	Euthyroid	Hyperthyroid
1. FT ₄ -DIA	None	None
2. FT ₄ -RIA	↑ Various disease	None
3. FT ₄ -T ₃ U	↑ TBG-def	None
4. FT ₄ -Mod. T ₃ U	None	None
5. FT ₄ -TBI	None	↑ T ₄ > TBG-Cap
6. FT ₄ -TBG	↑ TBG-def	↑ T ₄ > TBG-Cap
7. FT ₄ -TBG-C	↑ TBG-def	↑ T ₄ > TBG-Cap
8. FT ₄ -TBG-CT	Variable	↑ T ₄ > TBG-Cap

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SERUM FREE THYROXINE: COMPARISON OF MEASUREMENTS BY RADIOIMMUNOASSAY, FREE THYROXINE INDEX, AND EQUILIBRIUM DIALYSIS. N. Akimoto, T. Mitsuhashi, K. Kubota, N. Sasaki, S.C. Chiu, H. Uchimura, F. Matsuzaki, and S. Nagataki. The Third Department of Internal Medicine, Faculty of Medicine, University of Tokyo, Hongo, Tokyo.

Recently various radioimmunoassay kits for measuring serum FT₄ based on different principles have been commercially available. We determined serum FT₄ from patients with various thyroid states by those kits and compared the values with those by the accepted reference method of equilibrium dialysis. Serum samples were obtained from 11 untreated and 30 treated Graves' patients, 2 hypothyroid and 6 replacing patients with Hashimoto's disease and 6 pregnant women. The kits utilized were Gammacoat FT₄ (Clinical Assay), Immophase FT₄ (Corning) and LiquiSol FT₄ (Damon). Equilibrium dialysis was performed by the method of Sterling et al. Comparison of the values obtained by those kits and equilibrium dialysis gave correlation coefficients of greater than 0.8. However, separation of values between hypothyroid and euthyroid and between hyperthyroid and euthyroid were not as good as values by dialysis. It is concluded that the determination of FT₄ by these radioimmunoassay kits can be substituted for equilibrium dialysis although values by these newly available methods are as useful as those by classical or modified FT₄ Index.

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RADIOIMMUNOASSAY FOR SERUM FREE THYROXINE (FT₄) USING SPAC TOTAL THYROXINE RADIOIMMUNOASSAY SYSTEM. A. Nishikawa, M. Fukuchi, K. Tachibana, K. Hyodo, K. Onoue, K. Hamada, Y. Maeda, M. Hara and K. Nagai. Hyogo College of Medicine, Nishinomiya, Hyogo.

Serum free thyroxine(FT₄) assay system was developed using SPAC total T₄ kit. one ml of 0.9% NaCl was used as a incubation buffer. Standard FT₄ were calculated by equilibrium dialysis method in our laboratory. The following fundamental and clinical data of our system were obtained. The coefficients of variation for two control sera were 7.4-8.2% (interassay) and 5.3-6.2% (intraassay). The normal value for FT₄ ranged 0.9±0.2 ng/dl (mean±S.D.) as determined on 15 healthy adults. Serum FT₄ was increased in all 16 untreated patients with hyperthyroidism (5.0±1.6 ng/dl) and decreased in all 7 untreated patients with hypothyroidism (0.2±0.1 ng/dl). It was normal in 6 patients with euthyroid thyroid diseases and 6 pregnant women. The coefficients of correlation between our FT₄ values and FT₄ index(T₇), our FT₄ values and FT₄ values obtained with equilibrium dialysis method, and our FT₄ values and FT₄ values obtained with GammaCoat free T₄ system were r=+0.97, r=+0.85, and r=+0.96, respectively. These data indicate that FT₄ radioimmunoassay system using SPAC total T₄ radioimmunoassay kit with minor modification was considered quite useful clinically for evaluation of thyroid status.