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FUNDAMENTAL AND CLINICAL EVALUATION OF FREE T₄ RADIOASSAY KIT. S.Bito.H.Ito.Y.Morimoto. N.Oshiro,N.Tamaki,T.Ishihara, and T.Mori. RI Department and Internal Medicine, Kobe Central Municipal Hospital. Kobe.

Usefulness of free T₄ radioassay kit (Gamma Coat) were evaluated. This solid phase system was found to bind not only free T₄ but considerable part (9.4–17.7%) of total T₄. The 2nd step of incubation was direct saturation analysis by I-125-T₄, and standard curves were constructed by B/Bo % v.s known free T₄ concentration of the standard sera. Intra- and inter-assay variabilities were 4.8 % to 14.8 %, and 12.8 to 28.6 %, respectively. Dilution test using '0' standard serum, which had 0 µg/dl T₄ and 20.9 µg/dl TBG, showed almost linear regression, however, over estimation by TBG excess and under estimation by TBG deficiency were encountered. Similar results were obtained by recovery test also. Clinically, measured free T₄ in 29 normal subjects gave mean value of 1.24±0.36 (s.d.). Untreated Graves' patients had values exceeding 2.45, and hypothyroid patients had values less than 0.42, respectively. Most of euthyroid cases with TBG abnormalities showed normal distribution except for 1 case of 7.5 µg/dl TBG showing 0.51. Measured free T₄ showed a good correlation (r=0.899) with calculated free T₄ index. In conclusion, free T₄ radioassay kit was considered quite useful clinically, even though it had some problems fundamentally.

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FREE THYROXINE MEASUREMENT WITH RADIOIMMUNOASSAY. T.Nakagawa,K.Kawarada,M.Taguchi and N.Shinoda. Department of Radiology, Mie University School of Medicine and Central Clinical Division of Radiology, Mie University Hospital. Tsu, Mie.

GammaCoat Free T₄ Radioimmunoassay Kit was validated for the method and clinical results. Per cent free T₄ bound by coated tube as measured with I-125-T₄ labeled sera was much more than the one obtained by dialysis, increasing in hypothyroidism and decreasing in hyperthyroidism. Absolute free T₄ bound by tube estimated from the product of total T₄ by the per cent free T₄ was increased in hyperthyroidism and decreased in hypothyroidism, but not exactly proportional to the one by dialysis. This absolute free T₄ bound by tube is measured with competitive binding radioassay and bound fraction is referred to the standard curve which is labeled with real free T₄ value. Free T₄ values did not exactly fall linearly with dilution with hormone-free serum, especially in hyperthyroid sera. This result is explainable by the difference in unoccupied TBG concentration between hyperthyroid sera and hormone-free serum. Free T₄ concentration measured with different volume of 10µl to 100µl of samples remained constant. These results support that free T₄ measured with this kit is valid obeying mass law equations.

Normal value for free T₄ ranged 1.1 ± 0.2 ng/dl (mean±SD). There was a good correlation (r = 0.984) between free T₄ values as measured with dialysis and radioimmunoassay.

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FUNDAMENTAL AND CLINICAL EVALUATION OF THE MEASUREMENT FOR SERUM FREE THYROXINE CONCENTRATION WITH RADIOIMMUNOASSAY KIT. B.BAN,M.HASHEGAWA,T.OKI,Y.AWAYA.H.KIMURA,T.INOUE,T.KOJIMA and S.IINO. Division of endocrinology and Metabolism, Depart.Int.Med. Showa Un. Fugigaoka Hospital. Yokohama.

The fundamental and clinical evaluation of GammaCoat FT₄ which determines serum free thyroxine (FT₄) was performed in this study. The standard curve covered the range between 0.2 and 9.5ng/dl. The coefficients of variation for intraassay were from 4.4 to 10.3% and those for interassay were from 4.3 to 15.2%, respectively. The recovery of FT₄ for dilution of the serum with high concentration of FT₄ was 130%, and the cross reactivity for T₄ and T₃ were 100% and 5%, respectively. The coefficients of correlation between FT₄ and FT₄I (Thyrotect3 X Thyopac4/100), FT₄ and T₄ or FT₄ and T₃(RIA) were r=0.879, 0.892 and 0.735, respectively. The mean serum FT₄ concentration (mean±SD) were 1.62±0.33ng/dl for normal subjects (84 cases) and 1.48±0.25ng/dl for normal pregnant women (75 cases), respectively. The range or values of FT₄ were 2.7ng/dl and more for the patients with Graves' disease (35 cases), 0.36ng/dl and less for those with hypothyroidism (8 cases), between 1.06 and 2.40ng/dl for those with chronic thyroiditis, between 1.91 and 8.05ng/dl for those with subacute thyroiditis, 0.48 and 0.54ng/dl for those with TBG deficiency, respectively. These data indicate that FT₄ value well reflected the thyroid function.

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EVALUATION OF SOLID-PHASE RADIOIMMUNOASSAY FOR FREE THYROXINE. Y.Iida,T.Kosaka,K.Kasagi,K.Ikekubo,J.Konishi and K.Torizuka. Kyoto University School of Medicine. Kyoto.

A solid-phase radioimmunoassay (RIA) for the serum free thyroxine (FT₄), GammaCoat kit, was evaluated for its clinical usefulness. Coefficients of variation for 3 control sera were 6.5–7.1% (intraassay) and 7.1–12.5% (interassay). The percentage cross-reactivity of T₃ to the anti-T₄ antibody was 3.1%. Dilution of high FT₄ sera using a T₄-free serum with equivalent TBG concentration gave linear relationship. Time course of T₄ binding to the antibody was parallel in 2 euthyroid sera with high or low TBG concentrations. The normal range was 0.9–2.1 ng/dl as determined on 26 healthy adults. Serum FT₄ was increased in all 32 hyperthyroid and decreased in all 18 hypothyroid patients. It was normal in 14 pregnant women and 4 subjects with TBG deficiency, although free T₄ index (FT₄I) was low normal or low in these cases. In patients with liver cirrhosis (12) and chronic renal failure (9) FT₄I was low, and it was high in 2 of 7 patients with acute hepatitis. Except 5 cases of chronic renal failure, FT₄ was normal in these patients. Correlation of GammaCoat FT₄ with FT₄I (r=0.90) and with Immophase FT₄ (r=0.92) was good. Excellent correlation was observed between FT₄ (RIA) and FT₄ by equilibrium dialysis (r=0.98) in 18 subjects studied. Measurement of FT₄ by RIA was rapid and reproducible, and in conditions where TBG varies it more accurately reflected thyroid status than did the FT₄I.