

3836573 SIRS/M : MAJOR : RADIOLOGICAL SCIENCE ; M.Sc. (RADIOLOGICAL SCIENCE)

KEY WORDS : THYROGLOBULIN (Tg) / TUMOUR MARKER / RADIOIMMUNOASSAY (RIA) / IMMUNORADIOMETRIC ASSAY (IRMA) / DIFFERENTIATED THYROID CARCINOMA (DTC) / TOTAL BODY SCAN (TBS)

PANNEE JAMPATHONG : COMPARISON OF SERUM THYROGLOBULIN AS THYROID TUMOUR MARKER BY RADIOIMMUNOASSAY AND IMMUNORADIOMETRIC ASSAY. THESIS ADVISORS : VIPA BOONNAMSIRI, Ph.D., RUDEE PLEEHACHINDA, M.D. 77 p. ISBN 974-662-374-5

Serum thyroglobulin (Tg) measurements are used as tumour markers for monitoring patients with differentiated thyroid carcinoma (DTC). The clinical utility of two different thyroglobulin methods (RIA and IRMA) was compared and evaluated focusing on measurement methodology, low detection limit, precision, accuracy and specificity of the assays. The quality control results indicated that the low detection limit for Tg-DPC (RIA) and Tg-CIS (IRMA) was 2.28 ng/ml and 0.624 ng/ml, respectively. The assay precisions of both intra- and inter-assays had variations coefficients of 5.49-15.63% for Tg-DPC (RIA) and 5.56-8.27% for Tg-CIS (IRMA). The accuracies of the two assays were assessed by recovery tests which were 96.9-121.3% and 97.6-104.3% for Tg-DPC (RIA) and Tg-CIS (IRMA), respectively. No cross-reaction presented between thyroglobulin antiserum and the thyroid analogue compounds and no drift effects occurred either assays. The results showed complete parallelism between thyroglobulin standards and serial dilutions of thyroglobulin-containing serum. The hook effects were indicated with both Tg-DPC (RIA) and Tg-CIS (IRMA) at very high concentration of thyroglobulin. All results of the quality control profiles were satisfactory for both assays but the Tg-CIS (IRMA) proved to be superior to Tg-DPC (RIA).

Thyroglobulin concentrations which were determined in 120 euthyroid subjects ranged from 4.6-21.6 ng/ml with the mean (\pm SD) of 10.0 ± 1.46 ng/ml for Tg-DPC (RIA) and 0.8-19.0 ng/ml with the mean (\pm SD) of 3.8 ± 2.2 ng/ml for Tg-CIS (IRMA). Serum thyroglobulin levels were also measured in 187 patients who had undergone total thyroidectomy, I-131 ablation and receiving thyroxine suppression therapy. No thyroglobulin and microsomal autoantibodies by haemagglutination were detected. For the follow-up of patients, the cutoff value at 10 ng/ml for Tg-DPC (RIA) and at 4 ng/ml for Tg-CIS (IRMA) gave the diagnostic sensitivities and specificities of 88% and 97.5% respectively for Tg-DPC (RIA), and 90.4% and 98.9% respectively for Tg-CIS (IRMA).

This study suggests that the two commercial thyroglobulin assay kits are not equivalent and the clinical utility of thyroglobulin measurements would depend on the assay used. The Tg-CIS (IRMA) assay was found to be more sensitive, accurate, specific and more generally applicable for clinical use. Thus, it would probably have a more beneficial impact on the follow-up of patients. Serum thyroglobulin measurement is simple, cost-effective, precise, readily available and utilizable without necessitating withdrawal of thyroid suppression therapy. Therefore, determination of serum thyroglobulin by IRMA is a sensitive and specific means of detecting residual, recurrent or metastatic patients with DTC and may replace the expensive and inconvenient TBS.