

Comparison of the Influence of Thyroglobulin Antibodies on Serum Thyroglobulin Values from Two Different Immunoassays in Post Surgical Differentiated Thyroid Carcinoma Patients

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Measurement of serum thyroglobulin (Tg) is a highly specific test in the management of patients with differentiated thyroid cancer (DTC) after surgical treatment. The aim of our study was to evaluate and compare Tg levels in these patients found by radioimmunoassay (RIA) and immunoradiometric assay (IRMA) and to assess the influence of Tg antibodies (TgAbs) on the values obtained for Tg concentration. Both Tg and TgAb were determined postoperatively in the serum of 71 DTC patients using RIA Tg-PEG (INEP) and Tg IRMA (CIS) for Tg, together with TgAb (CIS) for circulating endogenous anti-TgAbs. The obtained concentrations were evaluated statistically. We found a significant difference of Tg concentrations between paired samples from the IRMA and RIA, although the intermethod comparison yielded satisfactory concordance of the two

assays (Spearman correlation coefficient -0.792). Positive TgAb was found in 28.2% of the serum samples analyzed. Spearman rank correlation analysis revealed a significant negative relationship between serum TgAb and Tg level measured by IRMA ($P = 0.02$), but not by RIA ($P = 0.417$). On the other hand, our clinical data revealed that 1/18 and 3/18 patients with proven lymph node metastasis had Tg values below the detection limit by RIA and IRMA assay, respectively. Their sera were TgAb positive. We concluded that RIA was less prone to influence of TgAb than IRMA. As the presence of TgAbs may interfere in Tg measurement irrespective of the method selected for determination, this should be considered during the clinical management of these patients. *J. Clin. Lab. Anal.* 23:341–346, 2009. © 2009 Wiley-Liss, Inc.

Key words: thyroglobulin; antithyroglobulin autoantibodies; radioimmunoassay; immunoradiometric assay; differentiated thyroid cancer

INTRODUCTION

Thyroglobulin (Tg) is an iodinated glycoprotein, which is produced only by thyroid follicular cells, and is present in the serum of most normal individuals in a low concentration. Under physiological conditions one gram of normal thyroid tissue is associated with serum Tg of approximately 1 µg/l (1). Serum Tg levels relate not only to thyroid mass but also to the thyrotropin (TSH) status of the patient (2). In patients with thyroid carcinomas (papillary and follicular) Tg is a useful tumor marker after total thyroid ablation by surgery and ¹³¹I therapy for detecting thyroid remnant or metastatic thyroid tissue (3,4). Thus, determination of serum Tg in the follow-up of thyroid cancer patients is

clinically important, but the precise measurement of Tg in serum is methodologically challenging (5,6) due to a number of technical problems (7,8). There are many commercial diagnostic sets, which can be divided into two main groups according to the detection principle: radioimmunoassay (RIA) and immunoradiometric assay (IRMA). The assay principle (9–12), as well as the potential presence of thyroglobulin antibodies (TgAb) in

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