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SAT-410

Background Radioioactive iodine therapy (RAI) is an excellent choice to treat thyrotoxicosis, particularly Graves´ disease (GD) patients. After RAI therapy, it is well known that TSH receptor antibodies (TRAb) rise in GD patients and autoimmunity can eventually surge in patients with toxic multinodular or uninodular goiter (TNG). Recently, biological assay distinguishes stimulating TRAb, called thyroid stimulating immunoglobulin (TSI) bringing a new perspective on follow-up, as TSI is involved in Graves´ pathogenesis of persistent thyrotoxicosis and ophthalmopathy after RAI therapy. **Objective** Analyze TRAb and TSI levels after 6 and 12 months of RAI therapy for thyrotoxicosis. **Patients and Methods** Patients were evaluated prospectively immediately before and 6 to 12 months after RAI therapy for thyrotoxicosis. Thyroid hormones were all measured using immunoassays (Roche Diagnostics Ltd). TRAb was analyzed by Elecsys Anti-TSHR assay (Roche Diagnostics, Germany) and was considered negative if < 1.75 IU/L (analytical range: 0.3 to 40 IU/L). TSI was measured by Immulite TSI assay (Siemens Healthcare, UK) and was considered negative if < 0.55 IU/L (analytical range: 0.1 to 40 IU/L). Clinical data and comparison of assays were analyzed by SPSS and MedCalc softwares. **Results** From 2017 to 2019, 54 patients (44 females) were prospectively evaluated after 6 months of RAI therapy, mostly because of GD (40 patients). A high degree correlation was observed between TRAb and TSI (Spearman correlation coefficient =0.875; p < 0.0001, 95% CI 0.784 to 0.929). After 6 months, among patients with GD, 5/40 patients had negative TRAb levels and 2/40 had negative TSI levels, whereas all TNG patients had both negative TRAb and TSI levels. In GD group, 4 patients showed subclinical hyperthyroidism and relapse occurred in 1 case. All patients with TNG showed euthyroidism status with or without thyroid medications. One year after RAI therapy, we evaluated 32 patients (23 GD) and 4/23 of GD had negative TRAb levels and only 1/23 had negative TSI level. All patients with TNG had negative TRAb and TSI levels after one year fo treatment. Subclinical hyperthyroidism was diagnosed in 5 patients with GD but none with TNG. Along follow-up, 4 patients with clinical diagnosis of GD with TRAb negative before RAI therapy became positive after RAI therapy and 3 patients became TSI positive. **Conclusions** Long term after RAI therapy for thyrotoxicosis treatment, TRAb and TSI are still positive in most GD patients and few cases can even turned to positive levels. Nevertheless, in TNG patients, RAI therapy is safe as TRAb and TSI maintained at negative concentrations and thyrotoxicosis is properly resolved.

Bone and Mineral Metabolism

CLINICAL ASPECTS OF OSTEOPOROSIS AND VITAMIN D ACTION

Total and Free 1,25dihydroxyvitamin D Levels in Postmenopausal Patients with Primary Hyperparathyroidism

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MON-388

Total and free 1,25-dihydroxyvitamin D levels in postmenopausal patients with primary hyperparathyroidism

Background: Vitamin D3 is metabolized to 25-hydroxyvitamin D [25(OH)D] in liver, and only after it goes to kidney is it converted to its biologically active form, 1,25-dihydroxyvitamin D [1,25$(OH)_2$D]. Also, the majority of both total 25(OH)D and 1,25$(OH)_2$D are tightly bound to vitamin D bind protein (DBP) and only a small portion remains in free form. In certain patient populations, like primary hyperparathyroidism (PHPT), concentrations of free vitamin D metabolites may be affected by altered levels of binding protein.

Objective: To evaluate total and free 1,25$(OH)_2$D levels in PHPT patients and healthy controls.

Methods: Thirty female patients with PHPT and 30 healthy age and body mass index (BMI) matched controls were enrolled (57.1 ± 9.8 years and BMI of 32.2 ± 7.2 kg/m^2). Serum levels of calcium, intact parathyroid hormone (iPTH), DBP, total 25(OH)D and 1,25$(OH)_2$D levels were examined. Serum free 25(OH)D and 1,25$(OH)_2$D levels were calculated using equations adapted from Bikle et al.

Results: There were no significant differences in age and BMI between groups. Compared to controls, patients with PHPT had lower total 25(OH)D (25.2 ± 7.5 vs. 19.3 ± 6.4 ng/mL; p <0.001) and DBP levels (40.7± 3.1 vs. 36.5 ± 5.7 mg/dL; p <0.001). There were no significant differences in total 1,25$(OH)_2$D levels or calculated free 25(OH)D levels between PHPT patients and controls; but the calculated free 1,25$(OH)_2$D levels were 27% higher in the PHPT patients compared to controls (p<0.001). The calculated free (but not total) 1,25$(OH)_2$D level was inversely correlated with DBP (r=-0.35, p<0.01) and positively correlated with iPTH levels (r=0.33, p<0.01).

Conclusion: Postmenopausal patients with PHPT had lower serum total 25(OH)D, but similar free 25(OH)D levels. In contrast, total 1,25$(OH)_2$D levels did not differ between patients and controls; however, patients had higher free 1,25$(OH)_2$D. Because total 25(OH)D and 1,25$(OH)_2$D levels do not reflect free levels, standard clinical measures of circulating vitamin D may not be an accurate estimate of true vitamin D status in patients with PHPT.

References: Bikle et al. Serum Protein Binding of 1,25-Dihydroxyvitamin D: A Reevaluation by Direct Measurement of Free Metabolite Levels. JCEM 1985;61:969-75.

Thyroid

THYROID DISORDERS CASE REPORTS I

Prolonged RAIA Induced Thyroiditis After 131 I Therapy for Graves' Hyperthyroidism

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SUN-510

Radioactive iodine ablation (RAI) has been used for the treatment of Graves' hyperthyroidism since 1946 and it is the primary recommended modality for Graves' disease treatment in many countries. Acute painful radiation thyroiditis after radioiodine treatment for hyperthyroidism of Graves' disease is considered uncommon. The prevalence