

# Role of Thyroglobulin in the Follow Up of the Differentiated Thyroid Cancer in Albania

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**Abstract:** **Background:** Thyroglobulin (Tg) plays a crucial role in the follow up of the patients with differentiated thyroid carcinoma (DTC). Persistence and increase of Tg after total thyroidectomy and I131 therapy are a indicator for persistence or recurrence of thyroid cancer. **Objective:** This study's objective is to evaluate the follow up of (DTC) in the Albanian patients. **Material and methods:** We retrospectively randomly selected 71 patients diagnosed with differentiated thyroid cancer. Patients had undergone total thyroidectomy and I<sup>131</sup> therapy. Thyroglobulin (Tg) levels were measured; before I<sup>131</sup> therapy while being under treatment with levothyroxine, before I<sup>131</sup> therapy with suspended levothyroxine, 6 months after I<sup>131</sup> therapy and one year after the I<sup>131</sup> therapy under levothyroxine treatment. Anti-Tg antibodies measurement was performed in all patients. **Results:** Mean age was 47.13±11.82 years old 91.5% of the patients were females and 8.5% males. 57.6% were diagnosed with papillary carcinoma and 11.3 % follicular carcinoma. Mean thyroglobulin levels before the I<sup>131</sup> under Levothyroxine (LV) suppression was 2.99 ng/ml, it increased to 7.73 ng/ml after LV suspension and dropped to 0.163 ng/ml 12 months after I<sup>131</sup>. **Conclusions:** Our data suggests the important role that Tg and anti-thyroglobulin antibodies have in the follow up of thyroid differentiated cancer.

**Keywords:** thyroid, cancer, thyroglobulin, follow up

## 1. Introduction

Thyroglobulin (Tg) measurements plays an important role in the follow up of the patients with differentiated thyroid carcinoma (1). Being the thyroid cells the only source of Tg in the human body, makes Tg highly specific in the follow up (2). Persistence and increase of Tg after total thyroidectomy and I131 therapy are a reliable indicator for persistence or recurrence of the thyroid cancer. An important aspect to evaluate is the presence of Tg Antibodies (Ab), their presence interferes with the Tg concentrations lowering the result attendibility (3).

Albania in a rapidly changing country as its socio-economical background has been in continuous developing the past 20 years. In Albania the incidence of thyroid cancer has been estimated to be 1.2% of the overall cancer diagnoses per year (4). More frequent in female vs males with a ratio of 3:1. The most frequent is the papillary form (38.6%), followed by the follicular form (34.9%), papillo-follicular (7.3%), and least frequent the medullary and anaplastic form. At our knowledge there is no published data analyzing the follow up of the thyroid cancer patients in Albania. The objective of our study is to evaluate Tg before and after I131 therapy in the Albanian patients.

## 2. Material and Methods

We retrospectively randomly selected 71 patients diagnosed with differentiated thyroid cancer from 2011 to 2013. All patients had undergone total thyroidectomy and I<sup>131</sup> therapy and were in the follow up period. We analyzed thyroglobulin (Tg) levels measured; before I<sup>131</sup> therapy while being under treatment with levothyroxine, before I<sup>131</sup> therapy when levothyroxine was suspended, 6 months after I<sup>131</sup> therapy and

one year after the I<sup>131</sup> therapy while being under levothyroxine treatment. Measurement of Anti-Tg antibodies was performed in all patients.

## 3. Results

Mean age of the patients was 47.13±11.82 years old (male 50 ± 11.6 years old; females 46.9 ±11.91 yea old). 91.5% of the patients were females and only 8.5% males. 57.6% were diagnosed with papillary carcinoma and 11.3 % had follicular carcinoma.

Mean thyroglobulin levels before the I<sup>131</sup> under Levothyroxine (LV) treatment was 2.99 ng/ml. Before the I<sup>131</sup> therapy with levothyroxine treatment suspended and TSH > 30 mUI/, mean Tg levels increased to 7.73 ng/ml. After the I<sup>131</sup> treatment mean Tg levels decreased to 0.332 ng/ml. Six months after the I<sup>131</sup> treatment mean Tg values was 1.572 ng/ml and a year after I<sup>131</sup> therapy, being under treatment with levothyroxine and TSH suppressed the mean thyroglobulin level drops to 0.163 ng/ml (Table.1). The anti-tg Ab were higher than 22UI/ml in 37% of the patients. Patients with multiple neck residual tissue or metastasis had Tg of 2.52 ng/ml to 47.37 ng/ml.

Table 1

Period	Mean thyroglobulin levels
Before I131 therapy under LV treatment	2.99 ng.ml
Before I131 therapy LV treatment suspended	7.73 ng/ml
After I131	0.332 ng/ml
6 month after I131	1.572 ng/ml
12 mothsh after I131 with Lv treatment	0.163 ng/ml

#### 4. Discussion and Conclusions

Differentiated thyroid carcinoma (DTC; papillary and follicular carcinoma) is the most common endocrine malignancy. After diagnosis the first step consists in total thyroidectomy. After thyroidectomy, most patients undergo ablative iodine-131 (<sup>131</sup>I) therapy, depending on the individual patient's situation and physician preference (6, 7). After that, levothyroxine (L-T<sub>4</sub>) therapy, aims to achieve TSH suppression or a low-normal thyrotrophin (TSH) concentration, depending on the disease (8). Treated properly, most patients with DTC have a good prognosis with normal life expectancy (9) However, some show persistent disease after initial therapy or develop recurrent disease during follow-up (10). Hence, life-long regular monitoring of DTC is suggested.

Tg measurement is an important milestone in the follow up of DTC. Improvements in sensitivity and precision of Tg assays, has positively impacted thyroid cancer follow up in the early 1980s and, due to the gradual improvements in the sensitivity and precision of Tg assays (11) the combination of Tg measurement and neck US is now regarded as the *de facto* standard of care (12).

To our knowledge this is the first study to evaluate the follow up thyroglobulin levels in DTC in our country. The results revealed a strong gender disparity with a predominance in females, similar ratio has been confirmed by other authors worldwide (13, 14).

The less aggressive histologic subtypes of thyroid cancer are more common in women, whereas the more aggressive histologic subtypes have similar gender distribution. Therefore understanding of thyroid cancer gender disparity could be helpful for better understanding the molecular basis for gender differences in thyroid and other cancers.(14).

This study confirms a prominent transient increase in Tg post-RAI ablation in DTC patients with complete resection, with the Tg levels falling below baseline after 12 months. We can notice before the I<sup>131</sup> an increased of TG approximately 2.6 time stimulated with a TSH > 30. After 6 month levothyroxine treatment was suspended and TG stimulated with a TSH > 30, mean levels was 1.572 which in lower than baseline. After 12 months TG levels dropped at 0.163 ng/ml (remission levels) under suppression therapy with Levothyroxine. Our data confirm that of other studies unveiling the good prognosis of differentiated thyroid cancer and the importance that thyroglobulin and antithyroglobulin antibodies have in the follow up.

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