

Evaluation of Progesterone and Estradiol in Sera and Tissue of Thyroid Patient

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Abstract

- Background** Thyroid cancer is more common in subjects with blood group A and O. Estrogenic receptors in some cases of goiter were observed. Obesity is associated with increased risk of thyroid carcinoma possibly by mechanism of production of estrogenic steroids by adipose tissue.
- Objective** This study was done to determine and compare the progesterone and estradiol in sera and tissue of female patients with various thyroid disorders.
- Methods** In this prospective study, Serum and thyroid tissue homogenate were analyzed by measuring progesterone and estradiol in fifty normal healthy women volunteers as a control, in addition to ten patients with malignant thyroid nodules proved by histopathology, and thirty seven patients with benign thyroid nodules from March 2008 to August 2009 in Al Kadimiya teaching hospital and Al Dirgham private hospital in Baghdad.
- Results** Serum estradiol and progesterone levels for both malignant and benign thyroid nodules patients were less than noticed in healthy control, while tissue estradiol and progesterone levels in malignant thyroid tumor were significantly higher than those in benign thyroid nodules.
- Conclusion** Tissue estradiol and progesterone levels can be used in the diagnosis and differentiation between malignant and benign thyroid nodules.
- Key word** progesterone, estradiol, Thyroid nodules

Introduction

The thyroid gland secretes two significant hormones, thyroxin and triiodothyroxine, commonly called T3 and T4. The thyroid secretion is controlled primarily by thyroid stimulating hormone (TSH), (TSH) secreted by the anterior pituitary gland which in turn is under control of thyrotropine releasing hormone secreted by hypothalamus (TRH) ⁽¹⁾ Iraq is an endemic goiter area ^(2, 3). Simple colloid goiter is the most common pathology and multinodular goiter is the commonest. Many factors involved mainly environmental, host factors and iodine deficiency ⁽⁴⁾. In malignancy,

chronic TSH stimulation is held to predispose to neoplastic changes ⁽³⁾.

Body weight is directly proportional; obesity by itself is associated with increased risk of thyroid carcinoma ⁽⁵⁾ possibly by mechanism of production of estrogenic steroids by adipose tissue. Recently they found the presence of estrogenic receptors in some cases of goiter, in addition to similarities of goiter ⁽⁶⁾.

Regularly the type of cancer of thyroid, Follicular carcinoma is more than papilloma cancer ^(6, 7) and blood group A and O are more affected ⁽⁸⁾.

Estrogen are secreted by placenta in the pregnant woman, while in non pregnant woman,

ovaries are responsible for secretion of estrogen. Progesterone is secreted in significant amount only during the latter half of each ovarian cycle by the corpus luteum⁽⁹⁾.

The aim of this study is to evaluate the progesterone and estradiol in sera and tissue of patient with various thyroid disorders.

Methods

Sera of fifty normal healthy women volunteers as a control, fifty nodules were taken from ten patients with malignant thyroid nodules proved by histopathology, and thirty seven patients with benign thyroid nodules were taken. The patients were admitted to al Kadimiya teaching hospital and Dirgham private hospital –Baghdad, from March 2008-August 2009.

The thyroid tumors tissues were immediately immersed in ice-cold saline solution after recording their dimensions, types and localized their positions in thyroid gland. Tissue samples were kept at -20 °C before processing up to two weeks. They were weighted and sliced with clean scalpel in Petri dish standing on ice. Slices were thawed and minced with the scissors then homogenized with 0.02M Tris buffer pH 7.4 with a ratio of 1:3 (W:V) tissue to buffer solution using a mechanical homogenizer⁽¹⁰⁾. The homogenate was filtered through ten layers of nylon gauze and centrifuged at 4 °C in order to precipitate the remaining intact cells and nuclei at 4000 xg for 30 minutes⁽¹¹⁾.

Sera and tissue homogenates were analyzed by measuring progesterone and estradiol⁽¹²⁾.

Results

The mean plus minus SD of serum estradiol was 66.8±16.43 pg/ml, 57±10.3 pg/ml and 110.7±7.8 pg/ml for malignant, benign and controlled patients respectively. While the results for serum progesterone was 0.35±0.07 ng/ml, 0.4±0.05 ng/ml and 0.27±1.1 ng/ml for malignant, benign and controlled patients respectively.

The values of estradiol in thyroid tissue were 85.07±19.4 pg/ml and 30.7±19.3 pg/ml for malignant and benign thyroid patients respectively. While progesterone level in thyroid tissues was 1.73±0.7 ng/ml and 0.44±0.3 ng/ml in malignant and benign patients respectively.

Discussion

The results presented in this study revealed a significant decrease in serum estradiol and progesterone level in both malignant and benign thyroid tumor patients compared to normal control. This result was agreeing with Kologlu et al⁽¹³⁾ and disagrees with Son et al⁽¹⁴⁾.

In this study, the estradiol and progesterone level in thyroid tissues was significantly increased in malignant thyroid tumors when compared with benign thyroid nodules. This indicates that tissue estradiol and progesterone level may be used in the diagnosis and differentiation between malignant and benign nodules. It is known that no other authors have studied human thyroid nodules estradiol and progesterone level.

Conclusion

Estimation of estradiol and progesterone level in thyroid tumor tissues can be used in both diagnosis & differentiation between malignant and benign tumors.

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