

Research Article

Analysis of Thyroid Autoantibodies and Thyroid Stimulating Hormone Expression in Patients with Thyroid Diseases in High Iodine Areas of Cangzhou

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Abstract

Objective: To analyze the differences in the expression of thyroid autoantibodies and thyroid-stimulating hormone in people with thyroid disease in the high iodine area of Cangzhou City. **Methods** A total of 90 patients with thyroid disease from high iodine area of Cangzhou City were enrolled, including 30 patients with hypothyroidism, 30 patients with goiter and 30 patients with thyroid cancer. A total of 30 healthy patients at the same time and in the same region were selected as the control. The subjects were divided into four groups: hypothyroidism group, Goiter group, Thyroid cancer group, and control group. The TSH levels and thyroid autoantibody levels of the four groups were analyzed. **Results** Compared with the control group, the levels of thyroid autoantibodies in the hypothyroidism, Goiter group and thyroid cancer group were significantly higher ($P < 0.05$), and compared with the control group, the TSH levels in the hypothyroidism group and the thyroid cancer group were higher, and the TSH levels in the Goiter group were lower ($P < 0.05$). **Conclusion:** Thyroid autoantibodies and thyroid-stimulating hormone are differentially expressed in different types of thyroid diseases in the high iodine area of Cangzhou City, which can be used as reference indicators for the identification and diagnosis of different types of thyroid diseases.

Keywords

Thyroid Autoantibodies, Thyroid-Stimulating Hormone, Different Types of Thyroid Diseases

1. Introduction

Thyroid diseases are frequent and common diseases of the endocrine system, and their types are mainly divided into Hashimoto's thyroiditis, hypothyroidism, hyperthyroidism, goiter and thyroid tumors. There are many pathogenic factors that can cause thyroid diseases, such as dietary structure, environmental factors, etc. [1], but the main cause is auto-

immune factors. After the occurrence of the diseases, it has a certain impact on the thyroid secretion function and normal physiology [2]. The clinical manifestations and symptoms of thyroid disease are also different, with great variation. Hypothyroidism is characterized by anorexia, pale complexion, muscle weakness, bradycardia, and no specific symptoms.

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thyroid edema (goiter) is mainly a diffuse enlargement of the thyroid gland, increased food intake, easy to sweat and so on. Thyroid cancer also has various manifestations, However, the early symptoms of the disease are not obvious and patients cannot easily detect them, which increases the difficulty of diagnosis [3-4]. However, the level of thyroid auto-antibodies and thyroid stimulating hormone (TSH) can change differently, either increasing or decreasing. Some studies [5] have pointed out that the early occurrence and development of thyroid diseases are related to these hormones and antibodies to a certain extent, which is of great significance in the diagnosis and differentiation of different types of thyroid diseases. This study mainly analyzed and discussed the changes of serum TSH levels, anti-thyroglobulin antibody (TgAb) and anti-thyroid peroxidase antibody (TPOAb) levels in patients with hypothyroidism, goiter and thyroid cancer in high iodine area of Cangzhou City, so as to understand the corresponding changes of hormones and antibodies and timely detect the existence of diseases. To provide some basis for clinical diagnosis and seek the best treatment plan.

2. Information and Methodology

2.1. General Information

A total of 90 patients with thyroid disease who visited the hospital from March 2019 to August 2021 were enrolled. Among them, there were 30 patients with hypothyroidism, 17 males and 13 females, aged 25~60 years, with an average age of (42.26 ± 1.01) years, 30 patients with goiter, 15 males and 15 females, aged 24~60 years, with an average age of (42.25 ± 1.03) years, and 30 patients with thyroid cancer, including 16 males and 14 females, aged 25~61 years, with an average age of (42.37 ± 1.05) years. At the same time and in the same region, 30 healthy people were selected as controls, including 19 males and 11 females, aged from 24 to 61 years, with an average age of (42.24 ± 1.12) years. There was no significant difference in the above data ($P > 0.05$).

2.2. Inclusion Criteria

Inclusion criteria: (1) from the high iodine area of Cangzhou City, (2) no history of thyroid disease treatment, no chronic diseases (diabetes, abnormal liver function, abnormal renal function, cardiac insufficiency, chronic infectious diseases, etc.), history of other tumor malignancy and medication, (3) no other autoimmune diseases, (4) no family history of hyperlipidemia, no recent use of hypolipidemic drugs, (5) exclusion of pregnancy, (6) informed voluntary.

2.3. Methodology

General information of the study subjects was collected, including age, gender, address, past medical history and medication history, and fasting peripheral venous blood was drawn in the morning for serum TSH, TPOAb, and TgAb by electrochemiluminescence. The changes of TSH, TPOAb and TgAb levels in each group were analyzed and compared, and the normal parameters of the laboratory were as follows: TSH was $0.27 \sim 4.2$ uIU/ml, TPOAb $< 0 \sim 34$ IU/ml, and TgAb $< 0 \sim 115$ IU/ml.

2.4. Statistical Analysis

SPSS20.0 statistical software was used for data analysis. The data results were expressed as $\bar{X} \pm s$, and t test was used, $P < 0.05$ was considered statistically significant.

3. Results

Comparison of TSH levels and thyroid autoantibody levels in the four groups (Table 1): the levels of TgAb and TPOAb in the hypothyroidism group, goiter group and thyroid cancer group were significantly higher than those in the healthy control group, and the difference was statistically significant ($P < 0.05$). Compared with the control group, the hypothyroidism group and thyroid cancer group had a higher TSH level, and the goiter group had a lower TSH level, and the difference was statistically significant ($P < 0.05$).

Table 1. The levels of TSH, TgAb and TPOAb in each group.

| Group (n=30) | TSH level (uIU/L) | TgAb (IU/ml) | TPOAb (IU/ml) |
|----------------------|-------------------|--------------------|--------------------|
| The control group | 3.22 ± 1.37 | 19 ± 1.08 | 26.71 ± 4.53 |
| Hypothyroidism group | 44.6 ± 2.46 | 219.57 ± 18.03 | 300.09 ± 13.07 |
| Goiter group | 2.23 ± 1.77 | 191.02 ± 8.89 | 99.41 ± 2.42 |
| Thyroid cancer group | 6.01 ± 1.56 | 147.18 ± 35.12 | 162.07 ± 11.12 |
| t | 12.97/3.456/10.40 | 26.9/94.64/8.57 | 16.18/22.80/9.41 |
| P | <0.05 | <0.05 | <0.05 |

4. Discussion

The thyroid gland is the largest endocrine gland in the human body, which synthesizes and secretes thyroid hormones, and its functional activities are directly regulated by thyroid-stimulating hormone (TSH) secreted by the pituitary gland, as well as by neurological, immune, and autoregulatory mechanisms [6]. A variety of factors can contribute to the development of thyroid disease [7, 8]. In recent years, researchers have begun to pay attention to the relationship between iodine and the occurrence of thyroid diseases. Iodine is an essential trace element for the synthesis of thyroid hormones, and proper iodine intake is conducive to maintaining the homeostasis of the human body, but long-term iodine excess or iodine deficiency can cause a variety of thyroid diseases [9]. Yunhe District, Cangxian County, Qingxian County, Nanbi, Dongguang, Wuqiao, Yanshan, Haixing, Huanghua and other areas in Cangzhou City of Hebei Province are water-borne high iodine areas, and the incidence of thyroid cancer is higher than the world average level [10]. Excessive iodine intake is mainly caused by iodine-induced hyperthyroidism, autoimmune thyroid disease, and hypothyroidism, and excessive iodine supplementation has a greater impact on people with genetic background of autoimmune thyroid disease and people in iodine-deficient areas [11]. Thyroid gland lesions can affect the synthesis and secretion of TSH by the pituitary gland. TSH can promote the growth, synthesis and secretion of thyroid hormone in the thyroid acinar epithelium, which is the main evaluation index of thyroid function and one of the main indicators for clinical diagnosis of thyroid diseases [12]. The results of this study showed that the TSH levels of patients with hypothyroidism and thyroid cancer in Cangzhou high iodine area were higher than those in the normal control group, while the TSH levels of patients with thyrocele were lower than those in the normal control group, suggesting that there were significant differences in TSH levels in patients with different types of thyroid diseases, which could be used as a reference index for clinical diagnosis of thyroid diseases.

Thyroid autoantibodies, mainly thyroglobulin antibody (TgAb) and thyroid peroxidase antibody (TPOAb), are markers of thyroid autoimmunity [13] and can directly reflect the degree of thyroid damage. Previous epidemiological and animal studies have shown a clear correlation between excessive iodine intake and the production of thyroid autoantibodies [14, 15]. Li Aiying *et al.* found that the serum levels of TSH, TG-Ab, and TPOAb in patients with autoimmune thyroid disease were higher than those in patients with non-autoimmune thyroid diseases and healthy individuals, and the levels of three indicators in patients with non-autoimmune thyroid diseases were higher than those in healthy people [16]. The results of this study showed that the serum levels of TgAb and TPOAb in the hypothyroid, Goiter and thyroid cancer group groups were significantly higher

than those in the healthy control group, suggesting that thyroid autoantibody detection is of great significance in the diagnosis of different types of thyroid diseases.

5. Conclusions

In summary, in patients with hypothyroidism and thyroid cancer, TSH level will increase, and TG-Ab and TPOAb will also increase significantly. In patients with goiter, TSH levels are reduced, while TG-Ab and TPOAb are shown to be elevated. Therefore, TSH, TG-Ab and TPOAb have different expression levels in different types of thyroid diseases, and they can also be used as important indicators for the diagnosis and differentiation of thyroid diseases in areas with high iodine.

Conflicts of Interest

No conflicts of interest.

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