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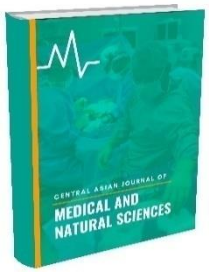

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PREVALENCE OF THYROIDECTOMY AND ESTIMATION OF HEMATOLOGICAL AND THYROID BIOMARKERS IN IRAQI PATIENTS

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Abstract: This study aimed to know the prevalence of thyroidectomy and Estimation of hematological and thyroid biomarkers in iraqi patients. One hundred individuals who had thyroidectomies in Iraq between January 2021 and February 2023 are the subjects of this prospective research. This research set out to determine if thyroidectomy is appropriate for individuals with benign or malignant thyroid conditions, and if so, what risks are associated with the procedure. Blood samples were drawn from all patients, serum was separated for hematological and thyroid function estimation. By Using commercial kits from the linear business, serum quantities of T3, T4, and TSH were determined by radioimmunoassay. CBC was done by using auto-analyzer. The current results showed that subtotal thyroidectomy was the higher percentages than another types of thyroidectomy. There was a significant difference between studied groups in thyroid biomarkers. The mean red blood cell (RBC) counts in the hypothyroid group were considerably lower than in the euthyroid group ($P<0.05$). The results show that compared to the euthyroid group, hypothyroid women had considerably lower levels of many RBC-related indices, including hematocrit and haemoglobin. When comparing the groups under study, overall leukocyte counts did not vary significantly.

In conclusion, Subtotal thyroidectomy was the higher percentages than another types of thyroidectomy.

Key words: CBC, RBC, TSH, TSHR

Introduction:

The impact of thyroid hormones on the immune system has been the subject of much experimental study. The hypothalamus-pituitary-thyroid axis relies on thyroid stimulating hormone (TSH) at its core.(1) Leukocytes make and utilise TSH, despite its well-known role in controlling thyroid hormone synthesis and metabolic function (2). It has been shown that lymphoid and myeloid cells have the TSH receptor (TSHR), which lends credence to the research showing that TSH may affect lymphocyte function (5). Evidence suggests that TSH enhances lymphocyte proliferation (6) and induces an increased antibody response (4). When TSH stimulates dendritic cells in the spleen, it increases cytokine release and phagocytic activity (3). Some lymphocyte, granulocyte, and monocyte progenitors in bone marrow express the TSHR.(7)

On the other hand, the thyroid hormones triiodothyronine (T3) and thyroxine (T4) may potentially have an indirect effect on the immune system via TSH.4 Research has shown that cells with reduced thyroid hormones have impaired immunological activity (4). Bone marrow B-cell formation is impaired in TSHR-deficient mice, but the number of pro-B cells rises when these animals are given T4.8 Mice deficient in T3 receptors also show a significant decrease in the amount of white blood cells in lymphoid organs such the spleen, bone marrow, and thymus.(9)

Hypo- and hyperthyroidism decrease immunological response, making tumours more likely to develop in a mouse model (10). In experimental animals, thyroidectomy has been shown to cause immune system disorders, such as reduced lymphocyte count, inhibition of the immunological response, decreased lymphoid organ weight, and decreased metabolic activity of macrophages (11). Some studies have shown that people with hypothyroidism are more likely to get infectious illnesses (12). In an animal model of sepsis, researchers found that thyroid hormone levels dropped, and that supplementing with these hormones aided in the recovery from sepsis and reduced death.(13)

Hematopoietic progenitor cells have also been shown to have a thyroid hormone receptor (14).

The gold standard for treating disorders of the thyroid gland is a thyroidectomy (15). When a patient presents with an enlarged thyroid gland—with or without nodules—as well as other symptoms such as compressive pain, a high index of suspicion of cancer, cervical lymphadenopathy, a high-risk lesion on ultrasound imaging, a suspicious or positive lesion on FNAC, or for cosmetic reasons, a thyroidectomy may be necessary (16,17).

This study aimed to know the prevalence of thyroidectomy and Estimation of hematological and thyroid biomarkers in iraqi patients.

Materials and Methods:

One hundred individuals who had thyroidectomies in Iraq between January 2021 and February 2023 are the subjects of this prospective research. This research set out to determine if thyroidectomy is appropriate for individuals with benign or malignant thyroid conditions, and if so, what risks are associated with the procedure.

Blood samples were drawn from all patients, serum was separated for hematological and thyroid function estimation. By Using commercial kits from the linear business, serum quantities of T3, T4, and TSH were determined by radioimmunoassay. CBC was done by using auto-analyzer.

Statistical analysis was done by using SPSS version 24.

Results and Discussions:

The current results showed that subtotal thyroidectomy was the higher percentages than another types of thyroidectomy (Table 1).

Table 1. Percentages of thyroidectomy

Operative tech.	No.	%
Total thyroidectomy (TT)	21	21%
Near total thyroidectomy (ITA)	13	13%
Subtotal thyroidectomy (STA)	57	57%
Lobectomy thyroidectomy (LT)	9	9%

Thyroidectomy is a typical therapeutic surgery done by surgeons with diverse backgrounds and expertise. It is one of the major modalities of therapy for thyroid gland illnesses (18).

Among the many possible reasons why the STT was more common than the TT as a surgical thyroid operation at Ramadi Teaching Hospital (n=57, 57% of cases) are: We may attain a long-term euthyroid condition without the need for thyroxin replacement since surgical problems are fewer than TT, and our patients have poor drug tolerance. Our results are at odds with the literature, which lists TT, reoperation, mass ligation of STA, and ligation of ITA from its main trunk as significant risk factors for the development of problems (19).

From table 2, there was a significant difference between studied groups.

Table 2. Levels of thyroid hormones among patients with thyroid dysfunction

Hormone	Euthyroid subjects	Hypothyroid subjects	Hyperthyroid Subjects
T3 (nmol/L)	2.34 ± 0.15	1.50 ± 0.47	**3.89 ± 0.94**
T4 (nmol/L)	139.2 ± 13.5	56.2 ± 2.4	**204.4 ± 3.3**
TSH (mIU/L)	**1.6 ± 0.3**	**137.1 ± 16.8**	**0.07 ± 0.001**

Using altered TSH, T3, and T4 levels at the third and sixth weeks, our study confirmed that the experimental groups had well-established hypothyroidism and hyperthyroidism, in line with previous studies (20,21). Results from this investigation were in agreement with those from Altaher et al. (22), who also discovered that T3 and T4 levels were much greater in hyperthyroid individuals than in the control group. On the other hand, TSH levels were much lower in hyperthyroid individuals. Prior research has shown that elevated thyroid hormones and a decreased TSH level are critical markers of thyrotoxicosis, and this finding is in line with the fact that hyperthyroidism is associated with a decreased TSH level. The majority of thyrotoxicosis cases are caused by Graves' disease (GD) and toxic nodular goitre, which is associated with hyperthyroidism (23). Previous studies on the

development of hyperthyroidism by Fadel et al. (24) have shown that a sharp decrease in TSH levels is often accompanied by an increase in T3, and T4 levels. It was in agreement with the most current results.

The mean red blood cell (RBC) counts in the hypothyroid group were considerably lower than in the euthyroid group ($P<0.05$). Table 2 shows that compared to the euthyroid group, hypothyroid women had considerably lower levels of many RBC-related indices, including hematocrit and haemoglobin. When comparing the groups under study, overall leukocyte counts did not vary significantly.

Table 2. CBC among studied groups

CBC parameters	Euthyroid subjects	Hypothyroid subjects	Hyperthyroid subjects
RBC Counts	$(4.8 \pm 0.2)\times 10^6$	$(4.2\pm 0.1)\times 10^6$	**$(4.9 \pm 0.3)\times 10^6$**
Hb(g/dL)	14 ± 0.2	13.1 ± 0.3	**13.7 ± 0.2**
Hematocrit (%)	39.8 ± 1	38.4 ± 2.7	**39.4 ± 1.2**
MCV (fl)	84.6 ± 4.3	85.4 ± 1.4	**81.4 ± 2**
MCH (fmol)	29.4 ± 3.5	29.2 ± 0.8	**28.6 ± 1.3**
MCHC (mmol/l)	33.6 ± 1.9	33.2 ± 2.5	**32.6 ± 1.9**
WBC counts	7361.2 ± 127	7068 ± 135	7493 ± 137

In addition, according to World Health Organisation standards, 12% of people with hypothyroidism were anaemic. Based on these findings, thyroid hormone has an effect on RBC-related variables such haemoglobin and hematocrit. In other studies, researchers have also shown that hypothyroidism is associated with anaemia (25). It has been shown that haematopoietic progenitor cells include a receptor for thyroid hormones (14). Additionally, it has been shown that thyroid hormones may influence erythropoietin, which in turn promotes the formation of erythroid colonies (14,25). Anaemia in hypothyroidism may be caused by decreased erythropoietin levels, according to some research (26).

The current research also shown that compared to both the hyperthyroid and euthyroid groups, the hyperthyroid group had a much lower mean red cell volume (MCV). We don't know what's changing or how it happened. The early senescence of red blood cells in hyperthyroid individuals' blood is one potential cause (27). To further understand how these changes occur in the peripheral blood cells of people with thyroid problems, further research is needed.

Conclusion:

Subtotal thyroidectomy was the higher percentages than another types of thyroidectomy.

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