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HİPOTİROİDİDE, BENLİK SAYGISI, ANKSİYETE VE DEPRESYON İLE KOTİZOL/DEHİDROEPİANDROSTERON SULFAT ORANLARININ KARŞILAŞTIRILMASI

COMPARISON OF SELF ESTEEM, ANXIETY AND DEPRESSION WITH CORTISOL/DEHYDROEPIANDROSTERONE SULFATE RATIOS IN HYPOTHYROID

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ÖZET

AMAÇ: Hipotiroidisi olan hastalarda benlik saygısı, anksiyete ve depresyon ile kortizol/dehidroepiandrosteron sülfat (DHEAS) oranları arasındaki ilişkiyi araştırmayı amaçladık.

GEREÇ VE YÖNTEM: : Çalışmaya 18-70 yaş arası toplam 150 kişi dahil edildi. Hastalar ötiroid, subklinik hipotiroid ve hipotiroid olarak üç gruba ayrıldılar. Tiroid fonksiyonu, DHEAS ve kortizol düzeylerini elde etmek için açlık kanı alındı. Her hasta aynı psikolog tarafından Beck Depresyon Ölçeği, Beck Anksiyete Ölçeği ve Rosenberg Benlik Saygısı Ölçeği'ni doldurdu.

BULGULAR: Kortizol, kortizol/DHEAS oranları, depresyon ve anksiyete puanları hipotiroidi grubunda anlamlı olarak yüksekti. Kortizol düzeyleri ile benlik saygısı puanları arasında (r=-.233, p<.05); TSH düzeyleri ve kaygı (r=-0.212, p<.05) arasında; kendine saygı ve kaygı (r=-0.297, p<.05) arasında; depresyon puanları ve kendine saygı (r=-0.411, p<.05) arasında; depresyon puanları ve kortizol/DHEAS oranı (r=-0.187, p<.05) arasında negatif korelasyon bulundu. Kortizol ile anksiyete puanları arasında (r=+0.195, p<.05); kortizol ve kortizol/DHEAS oranı (r=+0.533, p<.05) arasında ve de serbest T3 ve benlik saygısı puanı (r=+.202, p<.05) arasında ise pozitif kolerasyon bulundu.

SONUÇ: Belirgin hipotiroidisi olan hastalar düşük benlik saygısı, anksiyete ve depresyon puanları ile ilişkiliydi. Ayrıca depresyon puanları ile kortizol/DHEAS oranıyla negatif korelasyon bulundu.

ANAHTAR KELİMELER: Hipotiroidi, Kortizol, Benlik saygısı, Anksiyete, Depresyon.

ABSTRACT

OBJECTIVE: We aim to investigate the relationship self esteem, anxiety and depression with cortisol/dehydroepiandrosterone sulfate (DHEAS) ratios in hypothyroid patients.

MATERIAL AND METHODS: Total of 150 subjects, aged between 18-70 years were included study. Patients were divided into three groups as euthyroid, subclinical hypothyroid and hypothyroid. Fasting blood was drawn to obtain thyroid function, DHEAS and cortisol levels. Each patients filled the Beck Depression Scale, Beck Anxiety Scale and Rosenberg Self-Esteem Scale with the same psychologist.

RESULTS: Cortisol, cortisol/DHEAS ratios, depression and anxiety scores were significantly higher in hypothyroid group. A negative correlation was found between cortisol levels and self-esteem scores (r=-.233, p<.05); TSH levels and anxiety (r=-0.212, p<.05); self respect and anxiety (r=-0.297, p<.05); depression and self respect (r=-0.411, p<.05); depression and cortisol/DHEAS ratio (r=-0.187, p<.05). A positive correlation was found between cortisol and anxiety (r=+0.195, p<.05); cortisol and cortisol/DHEAS ratio (r=+0.533, p<.05), free T3 and self esteem score (r=-.202, p<.05).

CONCLUSIONS: Patients with overt hypothyroidism were associated with low self-esteem, anxiety and depression scores. In addition, a negative correlation was found between depression scores and cortisol/DHEAS ratio.

KEYWORDS: Hypothyroidism, Cortisol, Self-esteem, Anxiety, Depression.

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INTRODUCTION

There is a close relationship between the hypothalamus-pituitary-thyroid (HPT) and hypothalamus-pituitary-adrenal (HPA) axis and brain functions. In recent years, neurohormones have been directly associated with many psychiatric diseases (1). Thyroid hormones are also related to intracranial neurochemical reactions (2). The patients with major depression have been found to exhibit a chronological HPT axis irregularity due to the loss of fluctuation in serum thyrotropin (TSH) levels (3). Thyroid dysfunction can affect mood and the progression of mood disorders (4). Self esteem known as confidence in one's own value or abilities. Having healthy self-esteem can influence person's motivation, mental health, and overall quality of life. However, having very high or very low self-esteem can be problematic. Having low self-esteem can seriously affect the quality of life and increase risk of having suicidal thoughts (5).

Cortisol increases with stress and regulates excitability, behavior and mood. Hyperactivity of the HPA axis and hypercortisolism are common biological findings in patients with major depression (6). Cortisol returns to normal with the resolution of depression (7). Cortisol and dehydroepiandrosterone sulphate (DHEAS) are excreted from the adrenal gland and DHEAS is one of the parts of the HPA axis. Decreased serum DHEAS levels have been shown to be associated with psychosocial stress, decreased life satisfaction and functional limitations, personal stress and anxiety (8). The cortisol/DHEAS ratio can be used as an indicator of functional status of cortisol activity (9). The aim of this study is to evaluate patients with thyroid dysfunction with self-esteem, anxiety and depression; and to compare in terms of cortisol/DHEAS.

MATERIALS AND METHODS

Patient Selection

This study is cross-sectional. Age and gender compatible, fifty hypothyroid, fifty subclinical hypothyroid, and fifty euthyroid, total of 150 subjects, aged between 18-70 years, whom applied to The Department of Endocrinology and Metabolism Disease and The Department of Internal Disease at Medical School of Bozok University, were included in the study. If free T3, free T4 and TSH levels are in normal range, it is defined as euthyroid, if free T3 and T4 are in the normal range, but TSH level is high and between 4.5-10 μIU/mL, it is defined as subclinical hypothyroidism; and If tsh is high while free T3 and/or free T4 is low, it is defined as hypothyroidism. Consent form was obtained from all the participants. Patients age, height, weight, waist circumference were noted. Blood sampling was taken after 10-12 hours fasting between 08.00-10.00 am. The collected blood was centrifuged at 3000 rpm for 5 minutes to prepare serum, and then stored at -80 degrees and the blood of all patients was run at the same time. An enzyme linked immunosorbent assay (ELISA) kit with ARCHITECT C 8000 brand Biochemistry was used for DHEAS and cortisol levels. After blood testing, the participants were referred to the same psychologist and the Beck Depression Scale, Beck Anxiety Scale and Rosenberg Self-Esteem Scale were filled.

Beck Depression Scale: It was developed by Beck et al. in 1961. Turkish validity and safety studies were conducted (10). It is a self-assessment scale consisting of 21 items applied to measure the level and severity of depression symptoms. Each item receives a score between 0-3, and the sum of these results in a total score ranging from 0 to 63.

Beck Anxiety Scale: It consists of 21 items used to measure the level and severity of anxiety symptoms. Each item gets a score between 0-3 and a total score of 0-63. Turkish validity and safety studies were conducted (11).

Rosenberg Self-Esteem Scale: It is a self-evaluation scale consisting of 10 items used to measure the level of self-esteem. Each item is scored between 1 and 4 and is scored between 0 and 40 in total (12).

Exclusion Criteria: Those with a previous psychiatric disease (schizophrenia, bipolar affective disorder, alcohol and substance abuse…), mental retardation that prevents understanding of the test and interviews, chronic systemic diseases (severe kidney failure, severe liver failure, rheumatological disease), cancer, hypothyroidism due to antithyroid drugs, and pregnants were excluded from the study.

Ethical Committee

This study was approved by Ethics committee of Ethics Committee of Bozok University (Date and number of approval 09.03.2016/29).

Statistical Analysis

Statistical analysis was performed using the SPSS (version 23.00) program. Compliance of numerical variables with normal distribution was examined by Kolmogorov-Smirnov test. Descriptive statistics for numerical data were expressed as mean±standard deviation, and as numbers and percentages for categorical data. Relationships and intergroup differences for categorical variables were analyzed using the Chi-square test. One-way analysis of variance (ANOVA) was used to compare the three groups in terms of normally distributed numerical variables. When there was a difference between the groups in the one-way analysis of variance, pairwise comparison of the groups was made with the Tukey Test, one of the multiple comparison methods. The linear relationship between the two variables was analyzed by Pearson correlation analysis. The results were evaluated within the 95% confidence interval and the p<0.05 value was considered significant.

RESULTS

Hormone levels, depression, anxiety and self-esteem scores in euthyroid, subclinical hypothyroid and hypothyroid patients are shown in **Table 1**. A negative correlation were found between cortisol levels and self-esteem scores (r=-0.233, p=0.004); TSH and free T3 (r=-0.365, p<0.001); TSH and free T4 (r=-0.21, p=0.029); TSH levels and self respect (r=-0.297, p<0.001); Free T4 levels and anxiety (r=-0.212, p=0.009); free T3 and depression (r=-0.211, p=0.009); free T3 and anxiety (r=-0.287, p<0.001); depression and self-esteem (r=-0.411, p<0.001); depression and cortisol/DHEAS ratio (r=-0.187, p=0.022) **(Table 2)**.

A positive correlation was found between cortisol and anxiety (r=+0.195, p=0.001); cortisol and cortisol/DHEAS ratio (r=+0.533, p=0.001); cortisol and TSH (r=+0.18, p=0.029); TSH and depression scores (r=+0.315, p<0.001); TSH and anxiety (r=+0.388, p<0.001); free T4 levels and free T3 (r=+0.208, p=0.011), free T3 levels and self-esteem (r=+0.202, p=0.013), depression scores and anxiety score (r=+0,602, p<0,001) Table 2. Any correlation between cortisol level and free T3 and free T4, nor between free T4 level and depression and self-esteem.

Table 1: Results each groups

	Euthyroid n=50	Subclinic n=50	Hypothyroid n=50	P
TSH (µIU/mL) (0.27-4.94)	2.0±1.1	7.80±2.56	45.59±30.58	<.001
Free T_4(ng/dL) (1.0-1.7)	1.40±0.69	1.02±0.51	0.96±0.58	<.001
Free T_3(ng/dL)(2-2.44)	2.12±093	2.08±0.85	1.36±0.81	<.001
DHEAS (µg/dl) (0-492)	203.37±70.1	162.85±52.58	146.98±63.02	<.001
Cortisol (µIU/mL) (6-19.4)	9.49±3.76	10.25±3.70	11.49±3.93	0.032
Cortisol/DHEAS (µIU/mL/ µg/dl)	0.053±0.030	0.070±0.040	0.096±0.070	<.001
Depression score	10.30±9.5	14.9±9.6	21,5±10,1	<,001
Anxiety score	15,51±11,6	22,5±13,1	30,96±11,46	<,001
Self-esteem score	28,46±3,7	26,5±3,5	25,8±3,8	0,002

DHEAS; *Dehydroepiandrosterone sulphate.*

Table 2: The correlation between Thyroid hormones, cotisol, cotisol/DHEAS and depression, anxiety, self esteem scores

Variables	Depression score		Anxiety score		Self-Esteem score	
	r	p	r	p	r	p
Free T3	-0.211	**0.009**	-0.287	**<0.001**	+0.202	**0.013**
Free T4	-0.42	0.61	-0.212	**0.009**	+0.48	0.55
TSH	+0.315	**<0.001**	+0.388	**<0.001**	-0.297	**<0.001**
Cortisol	-0.34	0.58	+0.533	**0.001**	-0.233	**0.004**
Cortisol/DHEAS	-0.187	**0.022**	-0.75	0.26	-0.22	0.79

The p-values are bold where they are <0.05. **TSH** thyroid stimulan hormones, **DHEAS** dehydroepiandrosterone sulfate

DISCUSSION

Anxiety and depression scores were high and self-esteem scores were low in patients with overt hypothyroidism. TSH were negatively correlated with self-esteem. Cortisol/DHEAS ratio, is one of the parameters reflecting the functional of cortisol activity, showed a positive correlation with anxiety in this study.

Hypothyroidism may present with a wide range of symptomatic clinical manifestations. Depression, anxiety, poor memory, focusing problems, sleep problems occur. While most of these findings disappear with the treatment of the disease, some problems may persist (13). Psychiatric disorders are often overlooked in patients with thyroid hormone disorders. Studies have shown that patients with anxiety and depression have significant impairment in thyroid function (14, 15). In the study conducted by Gupta S et al. it was shown that 20% of patients with hypothyroidism had depression (16). It has been shown that the hormones acting in the HPA, including thyroid hormones, in some of

them increase and some of them decrease, are associated with depression (16, 17). According to the type of thyroid dysfunction may differ from each other in terms of symptoms of depression, anxiety and self-esteem (18). Self-esteem includes; confidence, identity, a feelings of security, a feeling of competence, a sense of belonging. The level of self-confidence can help people strike the balance that's right for them. The patient may find it difficult to pursue the life goals and establish and maintain healthy relationships. Self-esteem levels in patients with thyroid dysfunction have been given very little attention in the literature. In a study group with severely hypothyroid patients (median thyrotropin 83.2 mIU/L), the Beck Depression Test was performed; increased depression and suicidal ideation and decreased self-esteem were observed (19). Our difference from this study; we used a different test for self-esteem and included patients with subclinical hypothyroidism. Self esteem was significantly lower in the hypothyroid group compared to the euthyroid. Depression and anxiety scores were significantly higher while self-esteem scores lower in the overt and subclinical hypothyroid group.

Cortisol was found to be high in hypothyroid patients, which is explained by the decreased cortisol negative feedback in the HPA axis and metabolic stress. Similarly, cortisol was found to be high in hyperthyroidism, and the reason was explained as the increase in HPA axis activity (20-22). Cortisol levels were found to be significantly higher in the hypothyroid group in our study.

In research on HPA axis function, the focus has always been on the hormone cortisol. HPA functioning is complex. While the anti-inflammatory effect of cortisol is prominent (23), dehydroepiandrosterone (DHEA) has the both effects of anti-glucocorticoid and anti-inflammatory (24). In some psychiatric disorders, DHEA level is seen to be lower than cortisol. DHEA responses to acute stress and has been associated with the more cognitive function (25). DHEA is atrophied in depressed individuals. For these and other reasons, DHEA supports a mechanism that increases biological resistance to stress (25, 26). We found that DHEAS level is significantly lower in the hypothyroid group and also found the cortisol/DHEAS ratio higher in hypothyroid patients. This result could be explained with reduced adrenal steroidogenesis. The cortisol/DHEAS-ratio have been suggested to represent balance and stability between anabolic and catabolic activity. A high cortisol/DHEAS ratio was found in major depressive disorder (MDD) patients, and It has been suggested that this ratio could be used as a status indicator in MDD (27). While DHEAS was low and the cortisol/DHEAS ratio was higher in the hypothyroid group. Self-esteem was lower in the hypothyroid group. This suggests that a significant increase in cortisol level, within physiological limits, has negative effects on self-esteem together with high thyrotropin levels.

The limitations of our study are that the results cannot be generalized to all patients with thyroid dysfunction, because of the small number and the sample consisted of patients who applied to a single center.

Patients with overt hypothyroidism were associated with low self-esteem, anxiety and depression scores and high cortisol/DHEAS ratio. The cortisol/DHEAS ratio and depression; cortisol and self-esteem were negatively correlated. Self-esteem is one of the important factors for physical health. Consider referring psychiatry about self esteem, anxiety and depression, available treatment options, when initial thyroid medication starts.

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