

Original article / Araştırma**Thyroid gland functions are affected
in obsessive compulsive disorder**Osman MERMİ,¹ Murad ATMACA¹**ABSTRACT**

Objective: In the present study, it was aimed to examine thyroid functions in a group of patients with obsessive compulsive disorder (OCD) who had not any comorbid conditions. **Methods:** Our present study included forty patients diagnosed with OCD and forty healthy controls. The subjects were selected by the chart reviews among the patients with OCD who had applied to the Fırat University School of Medicine Department of Psychiatry, as inpatients or outpatients and had met the criteria of the present investigation. Thyroid hormone values had been obtained by using an auto analyzer. **Results:** Independent t test revealed that there were no statistically significant differences thyroid stimulating hormone (TSH) values between the patients with OCD and healthy control subjects whereas there were statistically significant reduced levels of free triiodothyronine (FT3) and free thyroxine (FT4) hormones in the patient group compared to those of healthy ones. **Conclusion:** Consequently, altered levels of thyroid hormones may be associated with pathophysiology or at least maintenance of OCD. (*Anatolian Journal of Psychiatry* 2016; 17(2):99-103)

Key words: OCD, TSH, thyroid hormones

Obsesif kompulsif bozuklukta tiroid işlevleri etkilenmektedir**ÖZET**

Amaç: Çalışmamızda, komorbid durumu olmayan obsesif kompulsif bozukluklu (OKB) bir grup hastada tiroid işlevlerinin incelenmesi amaçlanmıştır. **Yöntem:** Çalışmaya 40 OKB hastası ve 40 sağlıklı kontrol grubu alındı. Denekler, Fırat Üniversitesi Tıp Fakültesi Psikiyatri Bölümü'nde ayaktan veya yatarak tedavi gören ve çalışma ölçütlerini karşılayan OKB hastalarının dosyalarının geriye dönük taranmasıyla seçildi. Tiroid hormon değerleri auto-analizler kullanılarak elde edildi. **Bulgular:** Bağımsız t testi, tiroid salgılatıcı hormon (TSH) düzeylerinin OKB grubu ile sağlıklı kontrol grubu arasında istatistiksel olarak anlamlı fark olmadığını, serbest triiodotironin ve serbest tiroksin düzeylerinin ise hasta grubunda, kontrol grubuna göre istatistiksel olarak anlamlı düzeyde azaldığını ortaya koymuştur. **Sonuç:** Sonuç olarak, tiroid hormonlarının düzeylerindeki değişiklik, OKB'nin patofizyolojisiyle veya en azından hastalığın kliniğinin sürmesiyle ilişkili olabilir. (*Anadolu Psikiyatri Dergisi* 2016 17(2):99-103)

Anahtar sözcükler: OKB, TSH, tiroid hormonları

INTRODUCTION

Obsessive compulsive disorder (OCD) is characterized by obsessions and compulsions. Obsessions are unwanted intrusive thoughts

that lead to a significant distress. Compulsions are repetitive behaviors or mental actions that exert to neutralize obsessional thoughts. In Diagnostic and Statistical Manual of Mental Disorders 4th Text Revised version, it is classi-

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fied in anxiety disorders. Although an important amount of attempts has been performed on exploring the pathogenesis of OCD, the exact reason why the disorder occurs is not clear yet. Neurochemical abnormalities particularly serotonin and dopamine are emphasized. Genetic factors seem to be related to occurrence of OCD, particularly as demonstrated in the studies on serotonin transporter gene.¹ Biochemical factors have been evaluated to account for occurrence of the OCD. In this context, our working group carried out a number of studies.² Neuroimaging studies implicated some regions such as orbitofrontal cortex (OFC), thalamus, anterior cingulate cortex (ACC), and caudate nucleus. In this context, we examined volumes of these brain areas in the patients with treatment-naïve OCD and healthy comparisons comparatively.³ Afterwards, we also carried out another investigation on refractory OCD patients to identify which regions could be associated with refractoriness in OCD.⁴ Endocrinological investigations have been also performed on OCD patients. We examined the relationship between glucocorticoids and immunological marker, neopterin. In this context, we investigated dexamethasone suppression test (DST) and neopterin findings in the patients with pure OCD, those with the concomitant OCD and depression. It was found that there was significantly higher DST nonsuppression in the OCD+D group compared to OCD-D group whereas the mean neopterin levels were not different between the OCD-D group and the control group. There are limited number of studies on thyroid hormones in the patients with OCD. Witthauer et al.⁵ reported that patients with subthreshold OCD/OCD had higher prevalence rates of migraine headaches, respiratory diseases, allergies and thyroid disorders. Aizenberg et al.⁶ examined serum thyroid stimulating hormone (TSH), prolactin (PRL), and growth hormone (GH) values before and after stimulation with 200 micrograms of thyrotropin releasing hormone (TRH) in a group of OCD patients and determined that TSH responses in OCD patients were more blunted compared to those healthy comparison subjects, suggesting a dysregulation of the hypothalamic-pituitary-thyroid axis in OCD. In the Joffe et al.'s study no overall abnormalities in thyroid functioning in 20 patients with OCD in comparison with 20 patients with depressive disorder were found, with an abnormal specific thyroid functions in three patients.⁷ In another study, basal values of thyroid hormones and TSH were found to be normal, with a blunted delta TSH in 12.5% of the patients.⁸ In a longi-

tudinal follow-up case report, a patient who had adolescent onset psychosis and severe obsessions related to early onset of hypothyroidism is well-responded to fluvoxamine, risperidone and levothyroxine treatment.⁹ Another study measured the thyroid hormone levels at baseline and after clomipramine treatment. In that study, OCD patients exhibited considerable increased values of TSH, T3, and T4 compared to healthy comparisons before the clomipramine treatment, with significant decreases of TSH and T3 levels after the treatment with clomipramine. Moreover, the authors found TSH and T4 values to be associated with the reductions of obsessions and compulsions.¹⁰ As can be seen in these studies, on the one hand, there has not been enough research on thyroid functions in the patients with OCD, on the other hand there has been a contradictory results among studies. In addition, we thought that it might be very useful to study on pure OCD patients. For this reason, in the present study, we compared thyroid functions in a group of patients with OCD who had not any comorbid conditions with healthy controls.

METHODS

Our present study included forty patients diagnosed with OCD according to the DSM-IV. The patients were selected by the chart reviews of the patients with OCD who had applied to the Firat University School of Medicine Department of Psychiatry, as inpatients or outpatients and had met the criteria of the present investigation. Diagnosis of OCD had been carried out by senior psychiatrists of our clinic. For the present study, only OCD patients who had not a comorbid psychiatric disorder were included. Following exclusion criteria were used to select study subjects: the existence of current or history of any important medical illness, any history or current use of hormone drugs, use of oral contraceptives, any history or current thyroid function disorders, any history of carcinoid syndrome, any history of endocrinological condition, the existence of pregnancy or lactation, any history of parathyroid gland, and the existence of substance abuse or dependence. Healthy control subjects were composed of forty individuals who were screened by using chart review. It was selected those who had no history or any Axis I psychiatric disorder in themselves or in their first degree relatives. In addition to psychopathology, they should not have had one of followings: the existence of current or history of any important medical illness, any history or current use of

hormone drugs, use of oral contraceptives, any history or current thyroid function disorders, any history of carcinoid syndrome, any history of endocrinological condition, the existence of pregnancy or lactation, any history of parathyroid gland, and the existence of substance abuse or dependence. Local Ethics Committee approved the study.

In addition, when a control group was composed, healthy comparison subjects were similar to the patients with OCD regarding age and sex. The patients and control subjects had been taken venous blood samples from their forearm vein to analyze thyroid hormone levels. Thyroid hormone values had been obtained by using an auto analyzer (Coulter Max M, Coulter Electronics Ltd, Luton, UK).

Statistical analysis

When carrying out statistical analyses, Statistical Package for Social Sciences, thirteenth version

was used (SPSS Inc., Chicago, IL). Independent samples t test was used to compare the elements of thyroid function tests between patients with OCD and healthy subjects. Categorical variables were compared by using chi-square test. Under the values of a type 1 error of 0.01, type 2 error of 0.20, and effect size of 0.80, the sample size was calculated. The Pearson's correlation test was used to determine the linear association. In all analyses, significant alpha level was selected as 0.05.

RESULTS

In fact, the patients with OCD and healthy comparison subjects were similar, there were no statistically significant differences between groups regarding sex, gender composition, socioeconomically status ($p>0.05$). Information about sociodemographic variables are presented in Table 1.

Table 1. Demographic characteristics and hormone values of the patients with OCD and healthy controls

	OCD patients (n=40)	Controls (n=40)	p
Age*	36.92±12.19	35.50±8.18	0.63
Gender (F/M**)	28/12	24/16	0.66
Y-BOCS*	16.70±5.19	8.40±2.98	0.001
TSH*	1.85±1.46	1.59±0.77	0.11
FT3*	3.13±0.49	3.65±0.71	0.002
FT4*	1.05±0.18	1.13±0.16	0.024

* Independent t test for age, Y-BOCS, TSH, FT3 and FT4 comparisons, ** Chi-square test for gender comparison.

Group differences were identified by using independent t test. Independent t test revealed that there were no statistically significant differences thyroid stimulating hormone (TSH) hormone values between the patients with OCD and healthy control subjects (TSH levels; 1.85±1.46 mg/dl vs. 1.59±0.77 mg/dl for the patients with OCD and healthy comparison subjects, respectively; $p>0.05$) whereas there were significant reduced levels of free triiodothyronine (FT3), and thyroxine (FT4) levels in the patient group compared to those of healthy ones (FT3 levels; 3.13±0.49 mg/dl vs. 3.65±0.71 mg/dl; $p<0.001$; FT4 1.05±0.18 mg/dl vs. 1.13±0.16 mg/dl; $p<0.05$ for the patients with OCD and healthy comparison subjects, respectively). Of the patients, nine had lower FT4 levels under lower

limit while no patient had FT3 value under lower limit. On the other hand, no patient had the levels of FT3 and FT4 over upper limit. According to gender, there were no statistically significant differences for any of hormone levels within group comparisons ($p>0.05$). On the other hand, no statistically significant correlations were identified between hormone levels and age, or Y-BOCS scores ($p>0.05$).

DISCUSSION

In the present study, we investigated thyroid hormone levels of the patients with OCD without any comorbidity. We found that there were no statistically significant differences TSH hormone values between the patients with OCD and

healthy control subjects whereas there were statistically significant reduced levels of FT3 and FT4 in the patient group compared to those of healthy ones. Before the discussion of hormone values in the patients with OCD, it should be mentioned that Witthauer et al.⁵ reported that patients with subthreshold OCD/OCD had higher prevalence rates of migraine headaches, respiratory diseases, allergies and thyroid disorders. On the other hand, it was reported that twelve-month and lifetime mental disorder prevalence was higher in subjects with thyroid disease than in subjects reporting no chronic conditions.¹¹ In fact, there may be three categories of association between thyroid disorders and OCD. First association, as mentioned by Patten et al.,¹¹ is that thyroid function disorders may be a cause of a variety of psychiatric disorders. Second association is that thyroid function disorders may be a result of the disorder itself which is also supported by our present investigation. Third one is that OCD and thyroid function disorders together may be sourced a shared reason. As mentioned in the Introduction section, there have been a few studies evaluating thyroid hormones in the patients with OCD. In one of them, Aizenberg et al.⁶ examined serum thyroid stimulating hormone (TSH), prolactin (PRL), and growth hormone (GH) values before and after stimulation with 200 micrograms of thyrotropin releasing hormone (TRH) in a group of OCD patients and determined that TSH responses in OCD patients were more blunted compared to those healthy comparison subjects, suggesting a dysregulation of the hypothalamic-pituitary-thyroid axis in OCD. In the Joffe et al.'s study no overall abnormalities in thyroid functioning in 20 patients with OCD in comparison with 20 patients with depressive disorder were found, with an abnormal specific thyroid functions in three patients.⁷ In another study, basal values of thyroid hormones and TSH were found to be normal, with a blunted delta TSH in 12.5% of the patients.⁸ Another study measured the thyroid hormone levels at baseline and after clomipramine treatment. In that study, OCD patients exhibited considerable increased values of TSH, T3, and T4 compared to healthy comparisons before the clomipramine treatment, with significant decreases of TSH and T3 levels after the treatment with clomipramine. Moreover, the authors found TSH and T4 values to be associated with the reductions of obsessions and compulsions.¹⁰ In a longitudinal

follow-up case report, a patient who had adolescent onset psychosis and severe obsessions related to early onset of hypothyroidism was well-responded to fluvoxamine, risperidone and levothyroxine treatment.⁹ These studies and case report showed that thyroid hormone values seemed to be affected in the patients with OCD. On the other hand, the results of those papers are in accordance with those of our present investigation. It has been pointed out that thyroid hormones can impact the serotonergic system in the adult brain, with a positive correlation between thyroid hormone levels and serotonergic neurotransmission.¹² As much we do not know the exact role of thyroid hormones in the pathogenesis of OCD, it can be speculated that thyroid hormone alterations may be associated with occurrence or maintenance of OCD. On the other hand, it has been proposed that the serotonin system may be involved in the mood modulating effects of thyroid hormones among patients with affective disorders, with the fact that thyroid hormones are found to be most effective in patients with affective disorders when administered as an adjunctive treatment to antidepressants or mood stabilizers.¹² In this context, in refractory OCD patients, thyroid hormone levels should be measured and should be taken into consideration in the treatment of those patients.

Overall, our present study has some limitations. Despite the current findings, there are a number of issues to be considered. These methodological limitations of the present study need to be noted. We had no detailed psychological measurement for the evaluation of borderline personality disorder. First of all, retrospective chart review design of our investigation is a limitation. For this reason, our results should be supported by prospective designed investigations. Second, it should be mentioned about that our study group only examined absolute thyroid hormone levels although a variety of factors can affect these hormone levels. This may be considered as another limitation.

In summary, our present study revealed that there were no statistically significant differences TSH hormone values between the patients with OCD and healthy control subjects whereas there were significant reduced levels of FT3 and FT4 in the patient group compared to those of healthy ones. It is required to carry out prospective studies with larger sample.

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