The Effectiveness of Thyroid Function Tests Screening in Psychiatric Inpatients

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ÖZET:

Psikiyatri kliniğinde yatan hastalarda tiroid işlev-testleri kullanmanın etkinliği

Amaç: Bu çalışmanın amacı hastaneye yatırılarak tedavi edilen psikiyatri hastalarında tiroid işlevlerini taramanın etkinliğinin belirlenmesidir.
Yöntem: Bir genel hastanenin psikiyatri kliniğine yatırılan 538 hasta geriye dönük olarak incelenmiştir. Hastaların tanıları DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) tanı kriterlerine göre konulmuştur. Biyokimyasal tetkikler ve tiroid fonksiyon testleri (TFT) yapılmıştır. İstatistiksel analiz için ki kare ve t-testleri kullanılmıştır.
Bulgular: TFT 538 hastanın tümünde yapılmıştır, ancak hastane dosyalarından yalnızca 419 hastanın test sonuçlarına ulaşılabilmiştir. Çalışmaya 14-81 yaş arasındaki ergen ve erişkinler dahil edilmiştir. Çalışma grubunun 226'sı erkek (%53.9) ve 193'ü kadın (%46.1) hastalardan oluşmuştur. 62 Hastada (%14.8) en az bir TFT sonucu normal sınırların dışında bulunmuştur. Bu hastalardan ikisinin (%0.5) hipertiroidizmi, birinin (0.2%) hipotiroidizmi, 14'ünün (3.3%) subklinik hipertiroidizmi, 21'inin (5.0%) subklinik hipotiroidizmi varken 24'ünün (5.7%) anormal test sonuçları laboratuar hatası olarak kabul edilmiştir. Anormal TFT sonuçları olan hastalarda psikoterapotik ilaç kullanımına da bakılmış ancak kullanılan ilaç tedavisi ile normal TFT sonuçları arasında bir ilişki saptanmamıştır.
Sonuç: Alkol kullanımı ile ilişkili bozukluklar gibi spesifik hasta grupları dışında psikiyatrik hastaları tiroid fonksiyonları açısından taramanın etkinliği şüpheli görünmektedir. Her ne kadar bu çalışmanın sonuçları TFT sonuçları ve psikoterapotik ilaç kullanımı arasında bir korelasyon göstermiyor olsa da bu alanda daha geniş hasta gruplarında yapılacak olan kontrollü çalışmalara ihtiyaç bulunmaktadır.

Anahtar sözcükler: Tarama, tiroid hastalığı, tiroid işlevleri, psikiyatrik hastalıklar, yatan hasta

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ABSTRACT:

The effectiveness of thyroid function tests screening in psychiatric inpatients

Objective: The main aim of this study was to determine the effectiveness of thyroid function screening in psychiatric patients upon hospitalization in Turkey.
Method: A retrospective examination of 538 consecutive inpatient admissions to a general hospital psychiatry unit was conducted. Patients were diagnosed based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). Biochemical and thyroid function tests (TFT) were performed. Chi-square and t-tests were used for statistical analysis.
Results: TFT were performed on all 538 inpatients, but test results could be found for only 419 patients in the hospital data files. Therefore, these 419 patients were used in the current study. The study population consisted of adolescents and adults and ages varied between 14 and 81. The group included 226 male patients (53.9%) and 193 female patients (46.1%). Sixty-two patients (14.8%) had at least one TFT result outside of the normal ranges. Two of these patients (0.5%) had hyperthyroidism, 1 patient (0.2%) had hypothyroidism, 14 (3.3%) patients had subclinical hyperthyroidism, 21 patients (5.0%) had subclinical hypothyroidism, while 24 (5.7%) of the abnormal results were accepted as unclear findings. Psychotherapeutic drug use was also examined in the patients with abnormal TFT, but no correlation was found between therapy and abnormal TFT.
Conclusions: Effectiveness of screening psychiatric patients for thyroid disease seems to be questionable, except for specific patient groups such as those with alcohol abuse. Although the results of this study did not show a correlation between psychotherapeutic use and TFT, these results need to be confirmed by controlled studies in larger patient populations.

Key words: Screening, thyroid disease, thyroid functions, mental disorders, inpatients.

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INTRODUCTION

Scientific studies over the past 30 years have demonstrated changes in the hypothalamic–pituitary–thyroid axis (HPT axis) in patients with depression and to some extent also in patients with other psychiatric diseases (1). Recently, special interest has focused on the investigation of the HPT axis in patients suffering from anxiety and mood disorders (2,3,4). However, there are conflicting data concerning this relationship.

The most consistent findings derive from patients with major depression, in whom serum levels of thyroid stimulating hormone (TSH) seem to be reduced, although still within the normal ranges (5). Serum thyroxin (T4) and the free thyroxin index were significantly lower in depressed patients than those with mania or schizophrenia

in one study (6). In another study, in addition to illness variables, triiodothyronine (T3) but not T4, was found to be significantly related to relapse in major depression (7). Furthermore, the prevalence of thyroid abnormalities was reported to be higher in psychiatric inpatients than in the general population in Chile (8). Similarly, a study from Turkey showed that psychiatric symptoms were seen more frequently in hypothyroid and subclinical hypothyroid patients compared with a healthy control group. However, the symptoms were not correlated extensively with thyroid hormone levels (9). Sokolov et al. have suggested that the presence of thyroid function abnormalities in adolescence mood disorders are similar to those described in mood-disordered adults (10). Thyroid dysfunctions are also among medical problems associated with chronic alcohol abuse. Alcohol abuse frequently produces modest reductions in serum T4 levels and more considerable reductions in T3 levels (11,12).

In contrast, there are also studies reporting no association between altered thyroid function and the diagnosis of a mood disorder (13). While a retrospective study of acute geropsychiatric inpatients did show an increase in the prevalence of abnormalities in thyroid function tests (TFT) between the geropsychiatric patients and the comparison group, the difference was not statistically significant. Moreover, the investigators suggested that the TFT abnormalities in the study group may be related to an increased prevalence of unidentified systemic illness or to the presence of chronically poor nutrition (14). Roberts et al. have also reported that subclinical thyroid dysfunction was not associated with depression, anxiety, or cognition in elderly patients after the confounding effects of comorbid conditions and use of medications were controlled (15).

Subclinical hypothyroidism is the most common condition found by screening using TFT. Five to 10% of adult women have an elevated TSH level (16). In an analysis of the U.S. population, the prevalence of subclinical hypothyroidism was reported to be 1.2-5.8% among women and 1.8-3.4% among men. In the Whickham survey, a large, high-quality, population-based study with a 20-year follow-up, the prevalence was 4.0-17.4% among women and 1.0-6.2% among men. In an older subset of the population (greater than 60 years of age), the prevalence was about 1% in men and 1.5% in women (17). In another study, the prevalence of thyroid disease among inpatients was approximately 1-2% and was similar to the outpatient population (18). Lastly, in a study of adolescents, subclinical hypothyroidism was reported in 1.7% of patients and subclinical hyperthyroidism was reported in 2.3% of patients (19).

Taken together, these data demonstrate the unclear relationship between thyroid function and mental diseases. As a result, one important question is whether a physician should screen thyroid functions in psychiatric patients who have no specific indication for thyroid testing. Therefore, the main aim of this preliminary study was to determine the effectiveness of thyroid function screening in psychiatric patients upon hospitalization in Turkey.

MATERIALS AND METHODS

To clarify the relationships between mental disorders and TFT, 538 consecutive inpatient admissions to the general hospital psychiatry unit were examined retrospectively (study population included adolescents and adults aged 14-81 years). Informed consents of the patients were obtained during admission to the hospital. Patients were diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). TFT and biochemical tests were performed on all 538 inpatients, but only 419 of the test results could be found in the hospital data files; therefore, these 419 patients were included in the current study. Venous blood samples were drawn for measurements of serum TSH, free thyroxin (FT4) and free triiodothyronine (FT3) between 7.00 and 8.00 a.m. after an overnight fast within 48 hours of admission to the hospital. Serum TSH, FT4, and FT3 levels were analyzed by immunoradiometric assay kits. Normal ranges were defined as 0.4-4.0 IU/mL for serum TSH, 0.8-1.9 ng/dL for FT4, and 1.18-4.2 pg/mL for FT3. Chi-square and t-tests were used for statistical analysis.

RESULTS

Although TFT were performed on all 538 inpatient admissions to psychiatry unit, only 419 test results were available for use in this study. The study population consisted of adolescents and adults aged 14–81 years, with a mean age of 39.2 (SD: 13.0). The group included 226 male patients (53.9%) with a mean age of 40.7 (SD: 11.4), and 193 female patients (46.1%) with a mean age

of 37.4 (SD: 14.5). Of the 419 patients, 158 (37.7%) were diagnosed with a psychotic disorder, 74 patients (17.7%) were diagnosed with substance abuse disorders, 60 patients (14.3%) were diagnosed with a mood disorders, 25 patients (6.0%) were diagnosed with anxiety disorders, and 16 patients (3.8%) were diagnosed with somatoform disorders, while 86 patients (20.6%) were diagnosed with other psychiatric disorders. Mean length of hospital stay was 14.3 days (SD: 8.9).

At least one TFT was outside the normal ranges in 62 patients (14.8% of included patients). Twelve of these 62 patients with detected thyroid dysfunction also had a known history of thyroid disease, leaving 50 new findings of patients with abnormal TFT who presented with no clinical signs other than their mental illness. Out of the 419 patients, the 62 patients with abnormal TFT consisted of two patients (0.5%) with hyperthyroidism, 1 patient (0.2%) with hypothyroidism, 14 (3.3%) patients with subclinical hyperthyroidism, 21 patients (5.0%) with subclinical hypothyroidism, and 24 (5.7%) patients where the abnormal results were accepted as unclear findings.

The patient group with abnormal TFT results (excluding the 24 unclear findings) consisted of 17 males (44.7%) with a mean age of 37.8 (SD: 15.9) and 21 females (55.3%) with a mean age of 35.6 (SD: 14.8). Of these 38 patients, 15 (39.5%) had a diagnosis of a psychotic disorder, 4 (10.5%) were diagnosed with mood disorders, 4 (10.5%) were diagnosed with anxiety disorders, 2 (5.3%) were diagnosed with substance abuse disorders, 1 (2.6%) was diagnosed with a somatoform disorder, and 12 (31.5%) were diagnosed with other psychiatric disorders (Table 1). In these patients, there was no significant correlation between gender and thyroid disease, or between age and thyroid disease. However, there were significant negative correlations between age and TSH levels in male patients (Pearson chi square: -0.203, p≤ 0.01), and between age and T3 levels in female patients (Pearson chi square:-0.192, p≤0.01) within normal ranges.

In patients diagnosed with mood disorders, 15% showed at least one abnormal TFT result, with 8.3% of these results being unclear findings, 3.3% being subclinical hyperthyroidism, and 3.3% being subclinical hypothyroidism. In patients diagnosed with psychotic disorders, 12.7% had at least one abnormal TFT result, with 3.2% of these results being unclear findings, 0.6% being hyperthyroidism, 2.5% being subclinical hyperthyroidism, and 6.3% being subclinical hypothyroidism. In patients diagnosed with anxiety disorders, 20% showed at least one abnormal TFT result, with 4% of these results being unclear findings, 12% being subclinical hyperthyroidism, and 4% being subclinical hypothyroidism. In patients diagnosed with substance abuse disorders, 12.2% showed at least one abnormal TFT result, with 9.5% of these results being unclear finding and 2.7% being subclinical hypothyroidism. In patients diagnosed with somatoform disorders, 12.5% showed at least one abnormal TFT result, with 6.3% of these results being unclear findings and 6.3% being subclinical hyperthyroidism (Table 1).

Patients using psychotropic drugs regularly for more than six months were grouped together for the analysis of drug effects on TFT. The duration of psychiatric illness in the 61 included patients was broken down as follows: 1.6% of patients had a psychiatric illness for

Table 1: Classification of patients with abnormal TFT results

	Hyperthyroidism N/%	Hypothyroidism N/%	Suclinical Hyperthyroidism N/%	Subclinical Hypothyroidism N/%	Unclear Findings N/%	Normal N/%	Total Abnormal TFT Results ithin Diagnostic Group N/%	Total N/ % Abnormal TFT Results within whole Abnormal TFT Results
Mood Disorders	-	-	2 / 3.3	2 / 3.3	5 / 8.3	51 / 85	9 / 15	4 / 10.5
Psychotic Disorders	1 / 0.6	-	4 / 2.5	10 / 6.3	5 / 3.2	138 / 87.3	20 / 12.7	15 / 39.5
Anxiety Disorders	-	-	3 / 12	1 / 4	1 / 4	20 / 80	5 / 20	4 / 10.5
Subsbstance Abuse Disorders	-	-	-	2 / 2.7	7 / 9.5	65 / 87.8	9 / 12.2	2 / 5.3
Somatoform Disorders	-	-	-	(1 / 6.3)	1 / 6.3	14 / 87.5	2 / 12.5	1 /2.6
Other Psychiatric Disorders	1 / 1.2	1 / 1,2	5 / 5.8	5 / 5.8	5 / 5.8	69 / 80.2	17 / 19.8	12 / 31.6

6 months, 3.3% for 6-12 months, 23% for 1-5 years, 23% for 5-10 years, and 49.2% for more than 10 years. Drugs were used in 29.5% of patients for 6-12 months, in 45.9% for 1-5 years, and in 24.6% for more than 5 years. In this subgroup of patients, 14.8% were using antidepressants, 37.7% were using antipsychotics, 1.6% were using lithium, 1.6% were using valproic acid, and 1.6% were using benzodiazepines. When combination therapy regimens were accounted for, the drug use rates were 34.4% for antidepressants, 73.8% for antipsychotics, 6.5% for lithium, 9.8% for valproic acid, and 18% for benzodiazepines. There was no significant difference in FT3, FT4, or TSH values between the patients using typical and atypical antipsychotics within these time periods. Moreover, no significant difference in TFT could be found with the use of other psychotropic drugs including lithium.

There was a statistically significant correlation between FT3 levels and the amount of daily alcohol consumed (Pearson chi square: 0.195, $p \leq 0.01$) in male patients. There was also a significant correlation between T3 levels and the length of the time of alcohol use (Pearson chi square: 0.194, $p \leq 0.01$) in these patients, but no correlation was found between alcohol use related parameters and FT4 or TSH levels. Furthermore, there was no correlation between TFT results and alcohol related parameters in female patients.

Our results suggest that thyroid dysfunction was not a contributing factor to the number of previous psychiatric hospitalizations or psychiatric medication adherence. Also, our data did not show a relation between TFT and length of stay in hospital.

DISCUSSION

Our study results are consistent with other studies that suggest subclinical hypothyroidism is the most common condition found by screening TFT. In fact, the prevalence of subclinical hypothyroidism in our study was similar to that in previous studies. In general, the prevalence of subclinical hyperthyroidism is higher in patients diagnosed with anxiety and somatoform disorders compared to the general population.

There is little data available on the effects of antipsychotic drugs on thyroid function. Some alterations in serum concentrations of thyroid hormones have been reported with both typical (20) and atypical (21) antipsychotic drugs. Another study conducted on a geriatric population suggested that TSH increases may be associated with the use of neuroleptics and antidepressants (22). In contrast, there are also studies reporting no correlation between thyroid hormones and neuroleptic use (23). Routine monitoring of thyroid function in antipsychotic-treated patients without a history of thyroid disease is generally not recommended (24). With antidepressant treatment, the most common change in thyroid hormones is a decrease in T4 and FT4 without a significant reduction in TSH, although these changes are generally within the euthyroid range (25). In our study, there was no significant difference in FT3, FT4, and TSH values between the patients using any psychotropic drugs including lithium. The effect of lithium on the thyroid gland has been known for a long time and it is interesting that our results did not confirm these alterations (8, 10). This may be related to the small number of patients using lithium. The effects of other drugs should also be examined on larger patient groups.

Our study results suggest that thyroid dysfunction was not a contributing factor to the number of previous psychiatric hospitalizations or psychiatric medication adherence. Also, our results did not confirm the correlation between length of stay in a hospital and TSH levels that were reported in previous studies (25, 26).

Alcoholism may pose a significant risk for the development of depression. Alcohol abuse and dependence significantly affect thyroid function and considerable evidence suggests that minor changes in thyroid function may affect mood and behavior. Our study results show a significant relationship between FT3 and alcohol use in male patients, but further studies are required to fully characterize the connection between alcoholism, psychiatric disorders, and the thyroid gland.

When the results of this and other surveys are compared with the figures for thyroid disease in the general population, the value of screening psychiatric patients seems questionable. While some clinics screen all psychiatric patients, others only screen specific patient groups. Some study results suggest that routine evaluation of thyroid function should be considered in patients presenting with mood and panic disorders (27), while the results of other surveys do not support this suggestion. In order to eliminate unnecessary TFT, some researchers

have suggested using these tests only in female patients with affective disorders, patients with a past or family history of thyroid disease, or patients aged up to 65 years with presenile dementia (28). The results of another study showed that thyroid screening may contribute little to the diagnostic evaluation of major depressive disorders and moreover, psychiatrists request further tests only when they feel uncomfortable about diagnosis (29). According to Ordas et al, thyroid screening may not provide much to the diagnostic evaluation, although screening thyroid tests are often routine for depressed inpatients. In that study, overt thyroid disease was rarely detected among depressed inpatients (30). Leo et al. suggested that routine thyroid screening among adolescent psychiatric inpatients is unwarranted except in patients who display physical signs or symptoms suggestive of thyroid disease (31). However STAR-D study reported positive results of the use of thyroid augmentation. Even though some previous studies and our study results do not suggest routine screening of thyroid functions, screening studies may clarify the role of thyroid hormones in the treatment of depression (32).

In conclusion, although the data presented here demonstrate that screening psychiatric patients for thyroid disease seems to be questionable, except for specific patient groups, further studies are required to clarify the need of routine thyroid function screening in clinical practice. Although the results of our study did not show a correlation between psychotherapeutic use and TFT, these results need to be confirmed by controlled studies in larger patient populations. The effect of alcohol consumption seems to be related to abnormal TFT in this study, and points to the interrelationships among alcoholism, psychiatric disorders, and thyroid gland functions.

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