

Research Article / Araştırma Makalesi

Do the Clinical Features of the Thyroid Gland Differ in Early Senility Age and Old Age?

Tiroid Bezinin Klinik Özellikleri Erken Yaşlılık ve İhtiyarlık Döneminde Farklılık Gösterir mi?

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ABSTRACT

Aim: This study aimed to investigate whether the clinical features of the thyroid gland differed in early senility age and old age.

Material and Method: The retrospective analysis of patient data, aged between 65 and 84 years, was conducted at a tertiary care hospital. The demographic data of the patients, the values of thyroid function tests, the results of thyroid ultrasonography screening, and finalized disease of thyroid gland were investigated. Patients were categorized into two groups, 65-74 years (G1; early senility) and 75-84 years (G2; old age), according to World Health Organisation classification. The data of both groups were compared with suitable statistical tests.

Results: Out of the 426 patients, 90 (21.1%) were male and 336 (78.9%) were female. The mean age of the patients was 74.89±0.22 years. The thyroid gland did not include any nodules in 208 (48.8%) patients while nodules were present in 218 (51.2%) patients. Of those with nodules, 140 (32.9%) had multinodular goiter (MNG) and 78 (18.3%) had a single solitary nodule.

There were 144 (33.8%) patients in the G1 group, and the remaining patients were in the G2 group. Solitary nodules larger than 1 cm were detected in 22% of the G2 group and 11.1% of the G1 group. While those with autoimmune hypothyroidism were more common in the G1 group, those with solitary nontoxic adenoma were more common in the G2 group ($p<0.005$). The rate of euthyroidic patients was similar in the G1 and G2 groups, and the rate of hyperthyroidism patients was higher in the G2 group.

Conclusion: As aging progresses, the rate of thyroid nodule detection and hyperthyroidism clinic becomes more likely. Being aware of these conditions and evaluating geriatric patients is critical for correct follow-up and treatment.

Key Words: Hyperthyroidism, Senescence, Thyroid.

Öz

Amaç: Bu çalışma, tiroid bezinin klinik özelliklerinin erken yaşlılık döneminde ve ihtiyarlık döneminde farklılık gösterip göstermediğini araştırmayı amaçlamıştır.

Gereç ve Yöntem: Üçüncü basamak bir hastanede yaşları 65 ile 84 arasında değişen hasta verilerinin retrospektif analizi yapıldı. Hastaların demografik verileri, tiroid fonksiyon testleri değerleri, tiroid ultrasonografi tarama sonuçları ve tiroid bezinin kesinleşmiş hastalığı araştırıldı. Hastalar Dünya Sağlık Örgütü sınıflandırmasına göre 65-74 yaş (G1; erken yaşlılık) ve 75-84 yaş (G2; ihtiyarlık) olmak üzere iki gruba ayrıldı. Her iki grubun verileri uygun istatistiksel testlerle karşılaştırıldı.

Bulgular: Toplam 426 hastanın 90'ı (%21,1) erkek, 336'sı (%78,9) kadındı. Hastaların yaş ortalaması 74,89±0,22 yılı. Tiroid bezinde 208 (%48,8) hastada nodül yoktu, 218 (%51,2) hastada ise nodül mevcuttu. Nodülü olanların 140'ında (%32,9) multinodüler guatr (MNG), 78'sinde (%18,3) tek soliter nodül vardı.

G1 grubunda 144 (%33,8) hasta vardı, geri kalan hastalar ise G2 grubundaydı. G2 grubunun %22'sinde, G1 grubunun ise %11,1'inde 1 cm'den büyük soliter nodüller saptandı. Otoimmün hipotiroidili olanlar G1 grubunda daha sık görülürken, soliter nontoksik adenomlu olanlar G2 grubunda daha sıkı ($p<0,005$). Ötiroidik hasta oranı G1 ve G2 gruplarında benzer olup hipertiroidizm hasta oranı G2 grubunda daha yüksek idi.

Sonuç: Yaşlanma ilerledikçe tiroid nodülü saptanma oranı ve hipetiroidizm kliniği ile karşılaşma daha olasıdır. Bu durumların farkında olunarak geriatrik yaşta hastaların değerlendirilmesi doğru takip ve tedavi açısından önemlidir.

Anahtar Kelimeler: Hipertiroidizm, Yaşlılık, Tiroid.

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Introduction

The prolongation of lifespan has changed the definition of 'old age', which according to the World Health Organization (WHO) is divided into three subgroups: early senility, between the ages of 65 and 74; old age, between the ages of 75 and 84; and advanced old age (super-elderly), at ages 85 and older (1). Changes in the thyroid gland and its functions during the aging process are considered physiological (2). The body's iodine level decreases due to dietary salt restriction and diuretic use, particularly in individuals with comorbidities. This condition increases the incidence of thyroid disorders in the geriatric population (3).

The incidence of hyperthyroidism and hypothyroidism tends to rise with age (4). While overt cases of hyperthyroidism and hypothyroidism are more common among elderly women than men, it is believed that the difference would not be significant if thyroid autoimmunity was not included (5). In the diagnosis of hypothyroidism, it is recommended to revise the reference range of thyroid-stimulating hormone (TSH) for elderly patients and to place less value on additional tests for thyroid antibodies in this group. The interpretation of thyroid function tests (TFTs) may also be impeded by factors such as more common diseases and medications commonly used by the elderly (6).

Thyroid nodules are prevalent among older adults, and their occurrence rises with age. An estimated 50% of individuals aged 60 years and above are believed to have thyroid nodules (7, 8). Recently, the diagnosis of low-risk differentiated thyroid cancer has been linked to a surge in the recognition of thyroid nodules in imaging studies. In addition, treatment complications following thyroid cancer treatment are more prevalent, and clinical outcomes are poorer in elderly individuals.

This study aimed to investigate whether the clinical features of the thyroid gland differed in early senility age and old age.

Material and Method

This study was conducted in a tertiary hospital in Eskisehir by analyzing the registered data of patients aged between 65 and 84 years. Data from 426 patients were analyzed retrospectively. The demographic data (age, gender, and comorbidities) of the patients, the values of thyroid function tests (free T4, free T3 and TSH), the results of thyroid ultrasonography screening, and finalized disease of thyroid gland were investigated.

The patients were divided into two groups according to age range. 65-74 years of age was defined as G1 (early senility), and 75-84 years of age was defined as G2 (old age) (11). All data were analyzed according to the groups.

Statistical Analysis

Continuous variables were expressed as mean and standard deviation, while categorical variables were expressed as percentages. The results were reported as standard deviations and means. To test for normality, a Kolmogorov-Smirnov test was conducted. For comparing categorical parameters, Pearson's Chi-square test was used. A comparison of several numerical parameters was analyzed using an independent samples t-test. A statistical significance level of $p < 0.05$ was deemed statistically significant. Analysis was conducted using IBM SPSS Statistics 25 software.

Ethical Approval

The study received approval from the Institutional Review Board under decision number E-25403353-050.99-2020 and 206.

Results

Data from the records of 426 patients aged between 65 and 84 years were analyzed retrospectively. Of these patients, 90 (21.1%) were male and 336 (78.9%) were female. The mean age of all patients was 74.89 ± 0.22 years. The mean age of male patients was 75 ± 4 years, while it was 75 ± 5 years for female patients. Comparison of the patients' characteristics according to age groups is presented in Table 1. Nodules were detected in the thyroid gland of 218 (51.2%) patients. Out of those patients with nodules, 140 (32.9%) were diagnosed with multinodular goiter (MNG), while 78 (18.3%) had a solitary nodule. No thyroid nodules were observed in 208 (48.8%) patients.

There was a significant difference between the groups in the definitive diagnosis ($p=0.001$). In the G2 group, a >1 cm solitary nodule was detected in 22% of the patients and 11.1% in the G1 group ($p=0.000$). Additionally, the rate of MNG was found to be higher in the G2 group compared to the G1 group (35.8% vs. 27.1%). 80.8% of MNG patients were identified as euthyroid. Among patients with solitary thyroid nodules, 81.5% were euthyroid and 90.7% of them had a single nodule >1 cm by ultrasound. There was a significant difference between individuals with autoimmune hypothyroidism and those with solitary nontoxic adenoma ($p=0.003$). Individuals with autoimmune hypothyroidism were more prevalent in the G1 group, while those with solitary nontoxic adenoma were more prevalent in the G2 group. Thyroid papillary cancer was diagnosed in nine patients. A single nodule >1 cm was detected by ultrasound in 18.2% of patients with thyroid cancer.

Of the patients, 311 (73%) were euthyroid, while 62 (14.5%) had hypothyroidism and 53 (12.4%) had hyperthyroidism. The status of being euthyroid was similar in both the G1 and G2 groups (77.8% and 70.6%, respectively) with no significant difference between groups ($p=0.081$). In the G2 group, hyperthyroidism was detected in 15.2% of all patients than in the G1 group, where hyperthyroidism was only determined in 6.9%. The TSH value of patients presenting with overt hypothyroidism was 16 ± 23 in the G1 group and 10 ± 17 in the G2 group. Autoantibody results were available for only 240 patients. Of these patients, 77 tested positive for anti-TPO, 60 for antithyroglobulin, and 8 for TSH receptor antibody, and the remainings tested negative results.

Table 1. Comparison of the patients' characteristics according to age groups.

Patients Characteristics	G1 group (n=144)	G2 group (n=282)	p-value
Age^a	71±3	77±2	0.834*
Gender^b			0.834**
Female	112 (77.8%)	224 (79.4%)	
Male	32 (22.2%)	58 (20.6%)	
Thyroid function test results			0.000**
TSH ^a	4±10	3±8	
fT4 ^a	1.1±0.7	1.2±0.5	
fT3 ^a	1.5±1.3	2±1.2	
Comorbidity			
Arterial Hypertension (+) ^b	108 (75%)	179 (63.5%)	0.771**
Diabetes Mellitus (+) ^b	58 (40.3%)	58 (20.6%)	0.273**
CAD (+) ^b	29 (20.1%)	53 (18.8%)	0.338**
Osteoporosis (+) ^b	50 (34.7%)	87 (30.9%)	0.302**
Thyroid Drug Use (+) ^b	42 (29.2%)	84 (29.8%)	0.921**

^a : mean \pm standard deviation, ^b : n (%). * Independent samples t-test, **Pearson's Chi-square test. TSH: Thyroid Stimulating Hormone, CAD: Coronary Artery Disease.

Discussion

Thyroid dysfunction is prevalent among elderly individuals and can result in significant morbidity if not appropriately diagnosed and treated. Diagnosis of thyroid disease in older patients can be challenging due to the less apparent clinical features of abnormal thyroid function. Age-related increases in TSH levels have been reported in several studies (12). Overt hypothyroidism necessitates prompt treatment. Hypothyroidism is associated with higher mortality rates and cardiovascular events among adults aged over 65 years (13). Therefore, a timely and precise diagnosis of hypothyroidism is critical. Follow-up is preferable for subclinical hypothyroidism with TSH levels of up to 10 mU/L. Thyroid hormone dysfunction may have negative outcomes for elderly individuals. A study on healthy individuals with a long lifespan revealed that serum FT4 levels were comparable to those of younger controls, while serum TSH levels increased (14). Another study indicated that children of individuals with a family history of longevity exhibit lower serum FT4 and T3 levels and higher TSH levels. It has been suggested that the presence of high TSH may be attributed to longevity (15). In our study, a higher TSH value was observed in the G1 group than in the G2 group. This condition may be due to the fact that there were more patients with hyperthyroidism in the G2 group.

In the United States, the prevalence of hyperthyroidism is about 1.2%. Among older adults, the prevalence ranges from 0.5% to 3% (16, 17). It is crucial to note that overt hyperthyroidism requires urgent treatment as it poses a life-threatening condition. In this situation, I-131 treatment appears to be a reasonable approach (6). The most common cause of hyperthyroidism in the elderly in the United States is Graves' disease (18). Toxic nodular goiter is less common than Graves' disease, but studies conducted in Europe show that its prevalence in iodine-deficient regions and in elderly patients is actually higher than in Graves' disease (19-21). In this study, we detected 0.7% of Graves' disease only in the G2 group. Hyperthyroidism was 15.2% in the G2 group and 6.9% in the G1 group. We considered that the frequency of Graves' disease and hyperthyroidism in the elderly was related to polypharmacy, nutrition, and gastrointestinal absorption disorders with advancing age. Hyperthyroidism in elderly patients can be accelerated by excessive iodine intake facilitated by drugs or radiographic contrast agents, particularly in patients with thyroid dysfunction. Older patients with hyperthyroidism typically exhibit more asymptomatic than younger patients. (22-25). In the majority of cases of hyperthyroidism in the elderly, radioactive iodine is a good choice, providing a definitive cure and avoiding surgical risks. Thionamide therapy is impractical for elderly Graves' patients due to its side effects. As an alternative, beta-blockers are preferred. (6, 23). Elderly patients have increased exposure, especially to amiodarone and iodinated radiographic contrast agents, and therefore iodine-related thyroid pathologies are more common. Iodine-induced hypothyroidism is more common in the elderly than in younger patients due to exposure to iodine overload with certain medications and concomitant organizational defects such as Hashimoto's thyroiditis or Graves' disease (26-28).

Nodular goiter is a common condition and the frequency of palpated nodules in studies is 5% in women and 1% in men (3). The incidence of thyroid nodules in older adults increases with age, and estimates reveal that approximately half of those aged 60 and older have thyroid nodules (7,8). Age is a crucial factor in thyroid nodules, with individuals over 60 years old facing a

higher risk of malignancy. Nodules are less common among men, however, the likelihood of the nodule being malignant is higher than in women (3). Treatment of a solitary thyroid nodule is the same in all stages of adulthood (20). In our study, 218 (51.2%) patients had nodules in the thyroid gland. 19 (4.5%) patients were operated on. Among the patients who presented nodules, 140 (32.9%) had multinodular goiter (MNG) and 78 (18.3%) had solitary nodules. Solitary nodules larger than 1 cm were determined in 22% of the G2 group and 11.1% of the G1 group ($p=0.000$). The rate of MNG was higher in the G2 group than in the G1 group (35.8% vs. 27.1%). Nine patients were diagnosed with thyroid papillary cancer. Ultrasound detected a single nodule larger than 1 cm in 18.2% of patients with thyroid cancer.

Conclusion

In conclusion, our study demonstrated that thyroid dysfunction increased with age. It is crucial to evaluate geriatric patients based on age groups for accurate follow-up and treatment. Overlooking thyroid diseases in older adults can present challenges to their health. In a rapidly aging population with a high prevalence of multimorbidity, it is imperative to consider the advanced age factor when determining which patients warrant further assessment and referral for treatment. Emphasis should be placed on implementing evidence-based personalized interventions aimed at mitigating patient harm, enhancing health-related quality of life, and containing costs.

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Conflicts of interest

There are no conflicts of interest.

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