

## **EVALUATION OF EARLY ATHEROSCLEROSIS IN AUTOIMMUNE THYROID PATIENTS WITH HYPOTHYROIDISM HIPOTİROİDİZMLİ OTOİMMÜN TİROİT HASTALARINDA ERKEN ATEROSKLEROZUN DEĞERLENDİRİLMESİ**

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### **Abstract**

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The purpose of this study is the evaluation of early atherosclerosis through carotid intima-media thickness measurement in autoimmune thyroid patients with hypothyroidism. 30 autoimmune thyroid patients with hypothyroidism over the age of 18, who applied to Muğla Sıtkı Koçman University Medical Faculty between the dates of June 2014 and December 2014, were included in this study. And 30 healthy adults at the same age group were included in the study as the control group. Carotid intima-media thickness measurements of individuals were performed by a single radiologist expert in the field, who was unaware of their clinical and laboratory data. The age averages were found as 40.6±6.8 years in autoimmune thyroid patients with hypothyroidism (23 females and 7 males); and 44.2±8.3 years in healthy adults (24 females and 6 males). In our study, carotid intima-media thickness was measured as 0.60±0.10 mm in autoimmune thyroid patients with hypothyroidism and as 0.42±0.09 mm in healthy adults. There was a statistically significant difference between the average carotid intima-media thicknesses of patient and healthy groups ( $p<0.004$ ). Consequently, our study showed that carotid intima-media thickness increased in autoimmune thyroid patients with hypothyroidism. This finding makes us think that it could foreshadow early atherosclerosis in autoimmune thyroid patients with hypothyroidism.

**Key words:** Hypothyroidism, carotid intima-media thickness, ultrasonography

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### **Özet**

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Bu çalışmanın amacı, hipotroidili otoimmün troiditli hastalarda erken aterosklerozun karotid intima media kalınlık ölçümü ile değerlendirilmesidir. Bu çalışmaya, 2014 Haziran ve 2014 Aralık zaman aralığında Muğla Sıtkı Koçman Üniversitesi Tıp Fakültesi Hastanesi Endokrinoloji polikliniğine başvuran 18 yaş üstü toplam 30 hipotroidili otoimmün troiditli hasta dahil edildi. Kontrol grubu olarak aynı yaş grubundaki toplam 30 sağlıklı yetişkin dahil edildi. Karotid intima media kalınlık ölçümleri, yetişkinlerin klinik ve laboratuvar bilgilerinden haberi olmayan, alanında uzman tek radyolog tarafından yapıldı. Yaş ortalaması hipotroidili otoimmün troiditli hastalarda 40.6±6.8 yıl (23 kız ve 7 erkek); sağlıklı yetişkinlerde 44.2±8.3 (24 kız ve 6 erkek) yıl olarak bulundu. Bizim çalışmamızda, karotid intima media kalınlığı hipotroidili otoimmün troiditli hastalarda 0.60±0.10 mm, sağlıklı yetişkinlerde 0.42±0.09 mm olarak ölçüldü. Hasta ve sağlıklı grupların ortalama karotid intima media kalınlığı arasında anlamlı istatistiksel fark vardı ( $p<0.004$ ). Sonuç olarak, bizim çalışmamız hipotroidili otoimmün troiditli hastalarda karotid intima media kalınlığının artmış olduğunu gösterdi. Bu bulgu hipotroidili otoimmün troiditli hastalarda erken aterosklerozun habercisi olabileceğini düşündürmektedir.

**Anahtar kelimeler:** Hipotroidi, karotis intima-media kalınlığı, ultrasonografi

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## **Introduction**

Atherosclerosis leads to premature deaths (1). Therefore, the diagnosis of atherosclerosis in asymptomatic period is important with regards to prognosis (2, 3).

The relationship between hypothyroidism and hyperlipidemia is known for a long time. Serum T3 and T4 levels are normal, but changes happen in serum lipids in subclinical hypothyroidism period, when TSH levels start to rise (4,5). Total cholesterol and triglyceride levels rise in apparent hypothyroidism in general. Hyperlipidemia is the most important reason of the risk of coronary artery disease and atherosclerosis in such patients (6,7). Both hypocoagulability and hypercoagulability were reported in haemostatic changes in thyroid diseases (8).

The early symptom of atherosclerosis is the thickness increase in arterial wall. Intima-media thickness increase in carotid artery with revealed with B-mod ultrasonography is an early indicator of systemic atherosclerosis (9, 10).

The purpose of this study is the evaluation of early atherosclerosis through carotid intima-media thickness measurement in autoimmune thyroid patients with hypothyroidism.

## **Material and Methods**

### **Study Population**

30 autoimmune thyroid patients with hypothyroidism over the age of 18, who applied to Muğla Sıtkı Kocman University Medical Faculty between the dates of June 2014 and December 2014, were included in this study. Only the patients with hypothyroidism and not having any other biochemical and hematologic abnormalities were included in the study. And 30 healthy adults at the same age group were included in the study as the control group.

Patients with atherosclerotic risk factors of smoking, alcohol consumption, hypertension, obesity, familial hypercholesterolemia and diabetes were excluded from the study.

### **Carotid Intima-Media Thickness Measurement**

Individuals in the patient and control groups were rested at room temperature for 10 minutes before the ultrasound measurement. Carotid intima-media thickness measurements of individuals were performed by a single radiologist expert in the field, who was unaware of their clinical and laboratory data. The measurements were made through Toshiba Aplio 500 device with 5-12 MHz linear probe. The measurements were performed while patients were at supine position and their necks were at slight extension. The measurements were

made 1-2 cm proximal of carotid bulb section of both main carotid arteries.

### Statistical Analysis

The statistical analysis was made with SPSS version 18.0 (SPSS, Chicago, IL). The data were stated as mean  $\pm$  standard deviation. Independent sample t-test was used for the comparison of group averages.  $p < 0.05$  was accepted as statistical significance.

### Results

The age averages were found as  $40.6 \pm 6.8$  years in autoimmune thyroid patients with hypothyroidism (23 females and 7 males); and  $44.2 \pm 8.3$  years in

healthy adults (24 females and 6 males). There was not any difference between the ages and genders of patient and healthy groups ( $p > 0.07$ ;  $p > 0.50$ ). The carotid intima-media thickness of the autoimmune thyroid patients with hypothyroidism was measured as  $0.60 \pm 0.10$  mm on the average. And the carotid intima-media thickness of healthy adults was measured as  $0.42 \pm 0.09$  mm on the average. There was a statistically significant difference between average carotid intima-media thicknesses of patient and healthy groups ( $p < 0.001$ ) (Table 1).

**Table 1.** The findings of demographic and CIMT in hypothyroid and control group

	Hypothyroid group	healthy group	p
Age	$40.6 \pm 6.8$ years	$44.2 \pm 8.3$ years	$> 0.07$
Gender (F/M)	23/7	24/6	$> 0.50$
CIMT (mm)	$0.60 \pm 0.10$ mm	$0.42 \pm 0.09$ mm	$< 0.004^*$

CIMT: Intima-media thickness of carotid artery

### Discussion

There are publications, which prove that there was an increase at serum lipid levels in subclinical hypothyroidism. State of hypercoagulability, elevated blood density, elevated plasma total homocysteine concentrations are seen in thyroid hormone deficiency. It was reported that these factors could cause atherosclerosis and ischemic disorders in subclinical hypothyroidism (11). Taddei et

al. (12) stated that the lipid profile in hypothyroidism and the inflammatory changes led to impaired endothelium-dependent vasodilatation. In addition, they found TK, LDL-K and apolipoprotein B levels high in patient group.

Some studies drew conclusions other than the findings above. In a study, any difference was not found between patient and control groups with regards to cholesterol and triglyceride values and

TSH. In other studies, a significant relation could not be found between subclinical hypothyroidism and coronary artery disease incidence (13, 14).

In the study they performed, Güneş et al. (15) determined a statistically significant increase of intima-media thickness in patients with apparent hypothyroidism comparing to the normal group ( $p < 0.003$ ). However, although there was an increase in intima-media thickness in patients with subclinical hypothyroidism, it was not statistically significant. Nagasaki et al. (16) determined in their study that carotid intima-media thickness decreased in the patients with hypothyroidism, who underwent treatment ( $p < 0.005$ ). And they attributed this situation to the decrease in cholesterol and lipid parameters.

These studies show that a relation could not be fully established between atherosclerosis and hypothyroidism yet. In our study, carotid intima-media thickness was measured as  $0.60 \pm 0.10$  mm in autoimmune thyroid patients with

hypothyroidism and as  $0.42 \pm 0.09$  mm in healthy adults. There was a statistically significant difference between the average carotid intima-media thicknesses of patient and healthy groups ( $p < 0.001$ ). In our opinion, this increase may be based on autoimmune inflammation mechanisms or hypercoagulopathy in patients with normal cholesterol and lipid levels.

There are several limitations to our study. The most important of these is the small number of patients. Not classification of the patients with hypothyroidism according to the severity of disease, and not checking out other biochemical markers related to atherosclerosis may be considered as other limitations to the study.

Consequently, our study showed that carotid intima-media thickness increased in autoimmune thyroid patients with hypothyroidism. This finding makes us think that it could foreshadow early atherosclerosis in autoimmune thyroid patients with hypothyroidism.

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