

Visceral Adiposity Index Levels in Patients with Hypothyroidism

Selma Pekgör, Cevdet Duran*, Ruşen Kutlu**, İbrahim Solak, Ahmet Pekgör***, Mehmet Ali Eryılmaz****

The Department of Family Medicine, Konya Health Application and Research Center, University of Health Sciences, Konya, Turkey

*The Department of Internal Medicine, The Division of Endocrinology and Metabolism, The Medical School of Usak University, Uşak, Turkey

**The Department of Family Medicine, Meram Medical School of Necmettin Erbakan University, Konya, Turkey

***The Department of Statistics, Necmettin Erbakan University, Faculty of Science, Konya, Turkey

****The Department of General Surgery, Konya Health Application and Research Center, University of Health Sciences, Konya, Turkey

Abstract

Objective: To assess visceral adiposity index (VAI) as a sign of cardio-vascular diseases (CVD) in patients with overt or subclinical hypothyroidism.

Materials and Methods: Sixty-eight patients with hypothyroidism (29 with overt and 39 with subclinical hypothyroidism) and 33 age- and gender-matched control patients were included. VAI levels were calculated with the following formula: $(\text{waist circumference (WC)} / [36.58 + (1.89 \times \text{body mass index (BMI)})]) \times [(\text{triglyceride (TG) (mmol/L)} / 0.81) \times (1.52 \times \text{high-density lipoprotein cholesterol (HDL-cholesterol) (mmol/L)})]$ and $(\text{WC} / [39.68 + (1.88 \times \text{BMI})]) \times [(\text{TG (mmol/L)} / 1.03) \times (1.31 \times \text{HDL-cholesterol (mmol/L)})]$, respectively.

Results: While body weight ($p < 0.01$), BMI ($p < 0.01$), TG and VAI levels ($p < 0.01$) were higher in patients with hypothyroidism than controls. HDL-cholesterol levels were lower ($p = 0.02$) (Table 1). When patients were divided to groups as subclinical ($n = 39$) and overt hypothyroidism ($n = 29$) and compared with each other and controls ($n = 33$)

(Table 2), body weight ($p = 0.02$ and $p = 0.02$, respectively), BMI ($p = 0.01$ and $p < 0.01$, respectively) and TG ($p < 0.01$ and $p = 0.03$, respectively) were higher in overt and subclinical hypothyroidism groups than controls. HDL-cholesterol was lower only in the group with overt hypothyroidism than controls ($p = 0.01$). Although found similar to each other in overt and subclinical hypothyroidism groups. VAI levels were observed to be higher in both groups than controls ($p < 0.01$ and $p = 0.02$, respectively). In correlation analysis, a positive correlation was determined between thyroid stimulating hormone (TSH), BMI and VAI levels ($p = 0.03$ and $p < 0.01$, respectively).

Conclusions: Due to the association between increased VAI levels and CVDs, we consider that several measures should be promptly taken to decrease these risk factors in patients with hypothyroidism.

Keywords: Hypothyroidism, visceral adiposity index, cardiovascular risk

Table 1. The comparison of study parameters in patients with hypothyroidism and controls.

	Controls (n=33)	Patients with hypothyroidism (n=68)	p
Age (year)	36.73±2.39	40.31±1.54	0.20
Height (cm)	162.0±1.37	162.15±0.96	0.93
Weight (kg)	69.30±3.05	81.04±2.39	0.02
WC (cm)	93.09±4.18	100.54±1.86	0.06
Systolic BP (mmHg)	110.67±5.05	118.36±2.77	0.34
Diastolic BP (mmHg)	71.67±2.50	76.64±1.79	0.11
TSH (μIU/mL)	1.87±0.14	15.61±2.60	<0.01
Free thyroxine (ng/mL)	1.2±0.0	0.9±0.0	<0.01
Total cholesterol (mg/dL)	200.68±9.68	216.15±6.95	0.14
HDL-cholesterol (mg/dL)	67.29±8.95	51.86±2.98	0.02
Triglyceride (mg/dL)	93.74±7.69	145.12±16.36	<0.01
Body mass index (kg/m ²)	26.44±1.15	30.76±0.82	<0.01
VAI	3.37±0.43	6.03±0.76	<0.01

BP: Blood pressure. HDL-cholesterol: High density lipoprotein cholesterol. TSH: Thyroid stimulating hormon. VAI: Visceral adiposity index. WC: Waist circumference. Results are given as mean±standard deviation

Table 2. The comparison of demographic and laboratory parameters, and VAI levels in patients with overt and subclinical hypothyroidism and controls.

	Controls ¹ (n=33)	Subclinical Hypothyroidism ² (n=39)	Overt Hypothyroidism ³ (n=29)	p	p ^{1 vs 2}	p ^{1 vs 3}	p ^{2 vs 3}
Age (year)	36.73±2.39	40.36±1.94	40.24±2.54	0.37			
Height (cm)	162.0±1.37	162.41±1.31	161.79±1.42	0.78			
Weight (kg)	69.30±3.05	82.15±2.87	79.55±4.09	0.02	0.02	0.02	0.93
WC (cm)	93.09±4.18	101.53±2.10	99.26±3.34	0.16			
Systolic BP (mmHg)	110.67±5.05	119.05±3.70	117.41±4.26	0.63			
Diastolic BP (mmHg)	71.67±2.50	75.27±2.19	78.52±3.01	0.20			
TSH (μIU/mL)	1.87±0.14	6.71±0.22	27.58±5.39	<0.01	<0.01	<0.01	<0.01
Free thyroxine (ng/mL)	1.2±0.0	1.0±0.0	0.8±0.0	<0.01	<0.01	<0.01	<0.01
Total cholesterol (mg/dL)	200.68±9.68	211.42±7.19	222.34±13.09	0.35			
HDL-cholesterol (mg/dL)	67.29±8.95	55.18±4.83	47.39±2.47	0.03	0.11	0.01	0.12
Triglyceride (mg/dL)	93.74±7.69	124.45±11.76	172.21±34.23	0.01	0.03	<0.01	0.25
BMI (kg/m ²)	26.44±1.15	31.06±0.95	30.35±1.46	<0.01	0.01	0.04	0.67
VAI	3.37±0.43	4.98±0.63	7.36±1.51	<0.01	0.02	<0.01	0.08

BP: Blood pressure, HDL-cholesterol: High density lipoprotein cholesterol, TSH: Thyroid stimulating hormon, VAI: Visceral adiposity index, WC: Waist circumference. Results are given as mean±standard deviation.

¹: Controls, ²: Subclinical hypothyroidism, ³: Overt hypothyroidism.