Is There a Relationship Between Parathormone and Obesity Linked Disorders

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Objective: In this study, we aimed to investigate whether high parathormone (PTH) levels in obese patients contribute to the metabolic complications of obesity.

Methods: In this cross-sectional study, obese subjects, aged 18–65 years old, attending the obesity outpatient clinic of Kartal Dr. Lutfi Kirdar Training and Research Hospital in Istanbul, between June 2013 and January 2015, were evaluated. A total of 400 obese subjects were included in this study. Anthropometric, bioelectrical bioimpedance measures, blood tests, and 75 g oral glucose tolerance test (OGTT) results were evaluated.

Results: Of the 400 obese subjects, 335 were female. The mean age was 39 10. The median body mass index (BMI) was 36 (34–41) (interquartile range). Subjects were divided into quartiles according to blood PTH levels. Groups included Quartile 1 [n = 100, median PTH; 42 (36–45)], Quartile 2 [n = 100, median PTH; 55 (51–59)], Quartile 3 [n = 100, median PTH; 73 (68–78)], and Quartile 4 [n = 100, median PTH; 99 (89–125)]. Quartiles were evaluated with a generalized linear model adjusted for age, sex, and season of recruitment. Systolic and diastolic blood pressure, fasting glucose, homeostatic model assessment-estimated insulin resistance (HOMA-IR), insulin sensitivity index (ISI), triglyceride (TG), and high density lipoprotein cholesterol (HDL-C) were not different among quartiles. PTH and 25 hydroxyvitamin D (25(OH)D) were not associated with higher odds of prevalent metabolic syndrome (MetS) in obese subjects (OR 0.99 [% 95 CI 0.98-1.00], *P*=0.38 and 0.99 [% 95 CI 0.96-1.01], *P*=0.46, respectively). Decreased 25(OH)D levels were significantly correlated with higher odds of low HDL-C (OR 0.96 [%95 CI 0.93-0.99], *P*=0.04).

Conclusion: PTH does not contribute to the occurrence of metabolic components of obesity but there is a positive correlation between 25(OH)D and HDL-C.

TABLE 1. Quartiles according to PTH levels in all subjects

(Number/Male)	Quartile 1 (100/18)	Quartile 2 (100/17)	Quartile 3 (100/14)	Quartile 4 (100/16)	P[a]
PTH (ng/l)	42(36-45)	55(51-59)	73(68-78)	99(89-125)	
Anthropometric measures					
BMI (kg/m²)[b]	36(32-39)	38(34-41)	36(34-41)	38(35-41)	0,05
WC (cm)	104±13	104±12	106±13	107±13	0,44
TFM (kg)[b]	18(16-22)	20(17-23)	19(16-22)	20(17-24)	0,03
Trunk FFM (kg)[b]	25(22-28)	25(23-28)	25(23-27)	24(23-27)	0,91
PTF (%)	42±5	44±5	43±4	45±4	0,01
Metabolic parameters					
FG (mmol/l)[b]	5.2(4.8-5.6)	5.0(4.7-5.5)	5.2(4.7-5.5)	5.0(4.7-5.6)	0,39
HBA1C (%)[b]	5,4(5,1-5,7)	5,3(5,0-5,6)	5,3(5,1-5,6)	5,4(5,1-5,7)	0,75
HOMAIR[b]	2,9(1,7-3,9)	2,7(1,8-3,9)	2,6(2,1-3,8)	3,0(2,1-4,6)	0,15
ISI[b]	3,3(2,2-5,6)	3,3(2,5-5,3)	3,9(2,5-5,1)	3,2(2,2-4,5)	0,13
TC (mmol/l)	6.2±1.2	6.1±1.2	6.0±1.1	5.7±1.2	0,02
HDL-C (mmol/l)[b]	1.4(1.2-1.7)	1.4(1.2-1.6)	1.4(1.3-1.7)	1.4(1.2-1.6)	0,12
LDL-C (mmol/l)	3.9±1.0	3.9±0.9	3.8±0.9	3.6±0.9	0,78
TG (mmol/l)[b]	1.4(0.9-1.7)	1.1(0.9-1.7)	1.2(0.9-1.5)	1.1(0.9-1.6)	0,15
SBP (mmHg)[b]	120(110-130)	120(115-130)	120((117-133)	120(110-130)	0,33
DBP (mmHg)[b]	80(73-84)	80(74-86)	80(77-85)	80(70-90)	0,39
Uric A (µmol/l)[b]	273(232-333)	292(250-333)	274(238-315)	298(256-367)	0,15
ALT (U/l)[b]	21(16-27)	20(16-26)	17(13-25)	20(15-25)	0,31
CRP (mg/l)[b]	5,1(3,4-10,0)	5,4(3,4-9,0)	5,2(3,5-9,1)	6,5(3,4-10,0)	0,71
Mineral metabolism parameters					
25(OH)D (nmol/l)[b]	38(28-53)	25(18-38)	23(13-35)	20(13-25)	<0,001
Ca (mmol/l)[b]	2.4(2.3-2.5)	2.4(2.3-2.4)	2.4(2.3-2.4)	2.3(2.2-2.4)	0,69
P (mmol/l)	1.1±0.2	1.1±0.2	1.0±0.1	1.0±0.2	<0,001
ALP (U/l)	77±20	73±21	79±23	80±20	0,04
Crea (µmol/l)[b]	62(53-62)	53(44-71)	53(44-62)	53(44-62)	0,75

Data are presented as means ± standard deviations (SD) for continuous variables or median (25% and 75% interquartiles) for non-normally distributed variables.

[a] Generalized linear model adjusted for age, sex and season of recruitment (ANCOVA).

[b] Log transformed before performing the analysis.

TABLE 2. Odds ratio for prevalent metabolic syndrome and its components

	Model 1		Model 2		Model 3	
	OR (95% CI)	P[a]	OR (95% CI)	P[a]	OR (95% CI)	P[a]
MetS						
PTH	0.99(0.99-1.00)	0.85	0.99(0.98-1.00)	0.41	0.99(0.98-1.00)	0.38
25(OH)D	0.99(0.96-1.01)	0.54	0.99(0.96-1.01)	0.52	0.99(0.96-1.01)	0.46
Ca	1.04(0.87-1.24)	0.61	1.03(0.86-1.24)	0.68	1.03(0.86-1.24)	0.71
Age			1.01(0.99-1.03)	0.13	1.01(0.99-1.04)	0.09
BMI			1.09(1.04,1.14)	**<0.001**	1.10(1.05-1.15)	**<0.001**
Gender			0.72(0.40-1.28)	0.26	0.71(0.39-1.30)	0.26
CRP					0.96(0.92-1.01)	0.11
IR						
PTH	1.00(0.99,1.00)	0.74	1.00(0.99,1.00)	0.97	1.00(0.99,1.00)	0.99
25(OH)D	0.99(0.97,1.01)	0.65	0.99(0.97,1.01)	0.66	0.99(0.97,1.01)	0.68
Ca	2.17(1.39,3.40)	**0.001**	2.28(1.44,3.61)	**<0.001**	2.36(1.47,3.77)	**<0.001**
Age			0.99(0.97,1.01)	0.58	0.99(0.97,1.01)	0.48
BMI			1.05(1.01,1.10)	**0.01**	1.04(0.99,1.09)	0.07
Gender			0.41(0.21,0.81)	**0.01**	0.45(0.22,0.89)	**0.02**
CRP					1.03(0.98,1.07)	0.17
High Fasting Glucose						
PTH	1.00(0.99,1.01)	0.23	1.00(0.99,1.01)	0.50	1.00(0.99,1.01)	0.57
25(OH)D	1.01(0.99,1.04)	0.18	1.01(0.98,1.04)	0.36	1.01(0.98,1.03)	0.46
Ca	1.77(1.11,2.81)	**0.01**	1.74(1.09,2.78)	**0.02**	1.61(0.99,2.60)	0.05
Age			1.04(1.01,1.06)	**0.002**	1.03(1.01,1.06)	**0.003**
BMI			1.03(0.98,1.08)	0.20	1.02(0.97,1.08)	0.27
Gender			0.94(0.48,1.85)	0.87	1.25(0.60,2.61)	0.54
CRP					0.99(0.94,1.04)	0.78
Low HDL-C						
PTH	0.99(0.98,1.00)	0.29	0.99(0.99,1.00)	0.68	0.99(0.99,1.00)	0.68
25(OH)D	0.95(0.93,0.98)	**0.006**	0.96(0.93,0.99)	**0.04**	0.96(0.93,0.99)	**0.04**
Ca	0.58(0.38,0.88)	**0.01**	0.57(0.38,0.88)	**0.01**	0.57(0.37,0.88)	**0.01**
Age			0.95(0.92,0.97)	**<0.001**	0.94(0.92,0.97)	**<0.001**
BMI			0.99(0.95,1.03)	0.68	0.99(0.94,1.03)	0.69

[a] P value by multiple logistic regression analysis

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