THE ASSESSMENT OF SERUM VITAMIN D LEVEL AND IT'S RELATION TO METABOLIC SYNDROME IN OBESE CHILDREN AND ADOLESCENTS

Seda Aydogan[1], Asan Onder[2], Zehra Aycan[2]
[1]Dr. Sami Ulus Obstetrics, Children Health and Diseases Research and Training Hospital, Division of Pediatrics, Ankara, TURKEY
[2]Dr. Sami Ulus Obstetrics, Children Health and Diseases Research and Training Hospital, Pediatric Endocrinology Clinic, Ankara, TURKEY

OBJECTIVE

We aimed to investigate the relationship between vitamin D levels and metabolic sydrome (MS) in obese children and adolescents.

PATIENTS AND METHODS

51 obese children/adolescents at the age of 12.4 ±2.73 (7.0-18.0) years and 48 age- sex matched healthy controls were enrolled. Serum 25 OHD,1,25 (OH)2 D, calcium, phosphorus, alkaline phosphatase, parathormone (PTH) were measured in all participants. Vitamin D sufficiency, insufficiency, deficiency and severe deficiency were defined as serum 25 OHD concentrations >20ng/ml,<20ng/ml, <15ng/ml, <5 ng/ml respectively. IDF, NCEP ATP III and WHO criterias were used to describe MS .

RESULTS

2% severe deficiency,35.3 % deficiency, 23.5% insufficiency and 39.2% sufficiency of vitamin D was found in the obese group. The serum concentration of 25 OHD was 18.2±6.2 ng/ml, 1,25 (OH)2 D was 28.9±11.7 pg/dl in the obese group, and 25.6 ±5.9 ng/ml, 25.5 ± 9.3 pg/dl in control group respectively. Obese children demonstrated significantly decreased 25 OHD levels compared to control group; however their 1,25 (OH)2 D and parathormone levels were similar. *We found that, cut-off level for 25 OHD was 13.6 ng/ml (specificity 72.5%, sensitivity 81%) which lead to increased PTH by ROC analysis.*There was no association between serum 25 OHD, 1,25 (OH)2 D and MS.

Table 1: ***The relationship of Ca, P, ALP, PTH, 25-OHD and 1.25(OH)$_2$D levels between two groups***

	Obese group	Control group	P
25OHD (ng/ml)	18.2 ±6.24	25.6 ± 5.9	<0.001
1,25(OH)$_2$ D(pg/dl)	28.9± 11.7	25.5 ± 9.3	0.116
Ca (mg/dl)	9.7 ± 0.4	9.5 ± 0.9	0.216
P (mg/dl)	4.7 ±0.6	4.8 ±1.0	0.727
ALP(IU/L)	177.1 ± 8.1	161.7 ± 84.0	0.355
PTH (pg/dl)	48.8± 24.0	51.7 ± 30.2	0.611

Table 2: Laboratory findings of MS (+) and MS (-) patients depending on the modified IDF, NCEP ATP III and WHO criteria

	Group1a (n=18)	Group1b (n=33)	p	Group2a (n=36)	Group2b (n=15)	p	Group3a (n=30)	Group3b (n=21)	p
Fasting glucose (mg/dl)	94.0 ±13.7	88.4 ±8.3	0.074	90.7±12.1	89.6± 6.5	0.753	92.8±12.1	87.0±7.49	0.058
120-min glucose(mg/dl)	126.0±24.6	109.7 ± 21.2	**0.023***	120.8± 23.9	102.2±17.2	**0.018***	123.4±24.0	104.6±18.4	**0.007***
Fasting insülin (µlu/ml)	33.7±22.5	22.8± 12.2	**0.030***	29.6 ± 19.4	19.6 ± 6.2	0.059	32.2± 19.6	18.7±8.4	**0.005***
HOMA-IR	6.9± 3.7	4.9±2.5	**0.035***	6.2 ± 3.4	4.2 ± 1.5	**0.039***	6.5±3.3	4.3±2.1	**0.010***
Cholesterol(mg/dl)	171.8± 32.9	169.7 ± 38.5	0.848	174.2 ± 34.1	161.4±40.9	0.253	176.7±28.5	161.5±44.4	0.144
HDL(mg/dl)	38.3 ± 9.9	43.7 ± 9.64	0.067	41.7 ± 8.9	42.0 ± 12.4	0.924	40.7±11.3	43.3±7.6	0.363
LDL(mg/dl)	95.27± 22.2	99.6 ± 34.7	0.635	97.5 ± 29.4	99.2 ± 34.6	0.859	97.1±24.2	99.4±38.8	0.790
TG(mg/dl)	169.61±77.3	116.8 ± 65.1	**0.013***	160.6 ± 72.8	75.0± 21.2	**0.000***	165.4±76.2	92.7±42.3	**0.000***
25-OHD(ng/ml)	18.4±7.7	18.11±5.3	0.880	18.4± 6.8	17.7±4.6	0.692	17.7±6.6	18.9±5.6	0.491
1,25(OH)$_2$D(pg/dl)	26.6±9.7	30.1±12.7	0.316	29.1±12.6	28.5±9.5	0.887	28.8±12.5	29.0±10.9	0.963

Group1a:MS (+) depending on IDF, Group1b: MS (-) depending on IDF, Group2a: MS (+) depending on NCEP ATP III, Group2b: MS (-) depending on NCEP ATP III, Group3a: MS(+) depending on WHO, Group3b: MS (-) depending on WHO

Table 3: The correlation between carbohydrate/lipid metabolism and vitamin D levels in obese individuals

	25-OHD		1,25(OH)$_2$D	
	r	P	r	P
Fasting glucose (mg/dl)	-0.055	0.699	0.024	0.867
120-min glucose(mg/dl)	-0.154	0.313	-0.140	0.359
Fasting insulin (µlu/ml)	-0.129	0.368	-0.217	0.126
HOMA-IR	-0.143	0.318	-0.273	0.520
Cholesterol(mg/dl)	0.195	0.169	0.176	0.216
HDL(mg/dl)	0.118	0.408	-0.028	0.843
LDL(mg/dl)	0.159	0.265	0.166	0.244
TG(mg/dl)	0.212	0.135	0.048	0.740

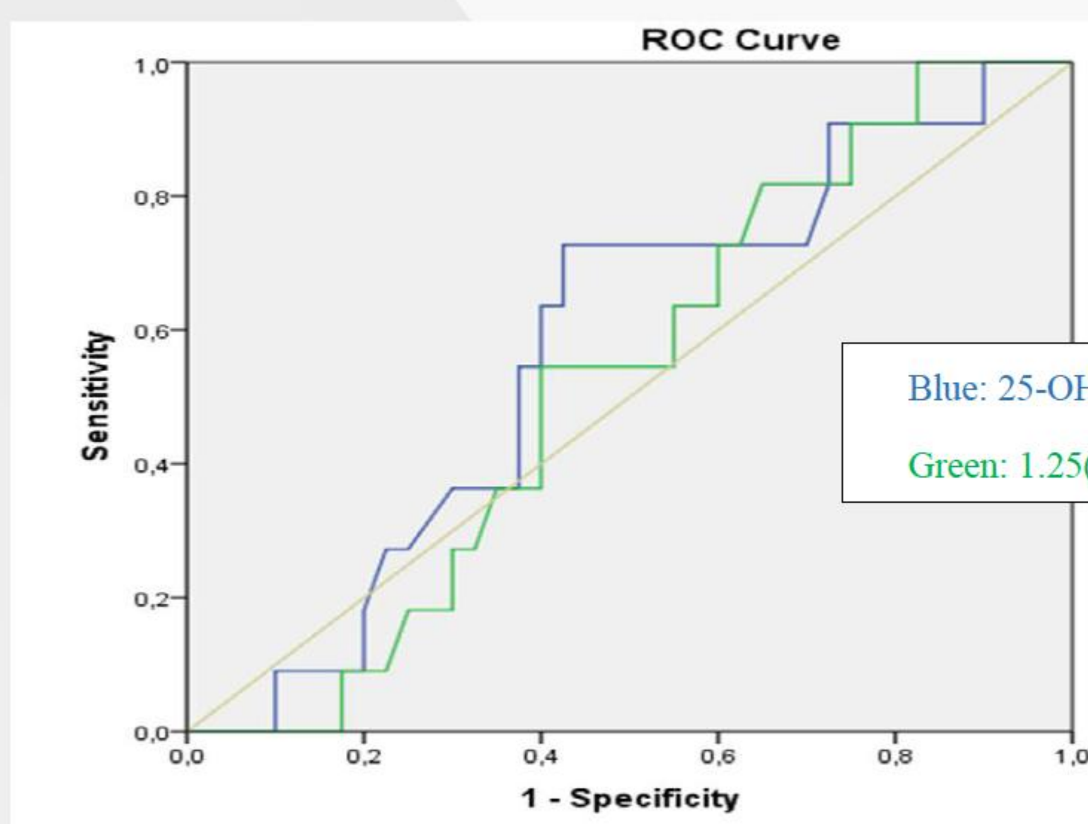

Figure 1:Serum 25-OHD and 1.25(OH)$_2$D ROC curve

CONCLUSION

We speculated that vitamin D insufficiency with normal PTH levels in obese children might be related with sequestration to the adipose tissue than low dietary intake. So, it is difficult to assume that vitamin D insufficiency is a risk factor of obesity. Lower 25-OHD levels in our obese group did not cause an increase in PTH levels; hence, we inferred that the assessment of 25-OHD insufficiencies would need a different cut-off in obese patients. In our study, this level for 25- OHD was found to be 13.6 ng/ml. Serum 1,25(OH)$_2$D levels in obese subjects and control group were similar –although serum 25 OHD levels were significantly lower in obese children- and it revealed that 1,25(OH)$_2$D level can be used to determine vitamin D deficiency in obese cases. New methods and future prospective studies with large numbers are needed for the assessment of vitamin D deficiency in obese children.

PosterSessionOnline.com