Association between oxidative stress and bone turnover markers in the obese children

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OBJECTIVES

Recent data have been showed that free radicals are involved in either bone resorption and atherosclerosis development in adults. In paediatric population the important risk factor for the early atherosclerosis development is obesity, which can be also associated with the disturb bone turnover. **The aim of the study was to evaluate the interrelationship between oxidative stress and bone turnover markers in obese children vs. lean controls and correlated them with the anthropometrical status and metabolic activity of adipose tissue.**

MATERIAL & METHODS

- Bone turnover markers (osteocalcin (OC), N-terminal telopeptide of type I collagen (NTx), sRANKL), oxidative stress markers (total antioxidative capacity (TAC), glutathione peroxidase (PerOx), oxy-LDL) and leptin were determined in 50 obese children and 79 healthy controls

- Nutritional status by BMI, BMI Z-score, waist/hip ratio (WHR) and waist/height ratio (W/HtR) calculation and body composition was assessed in all children.

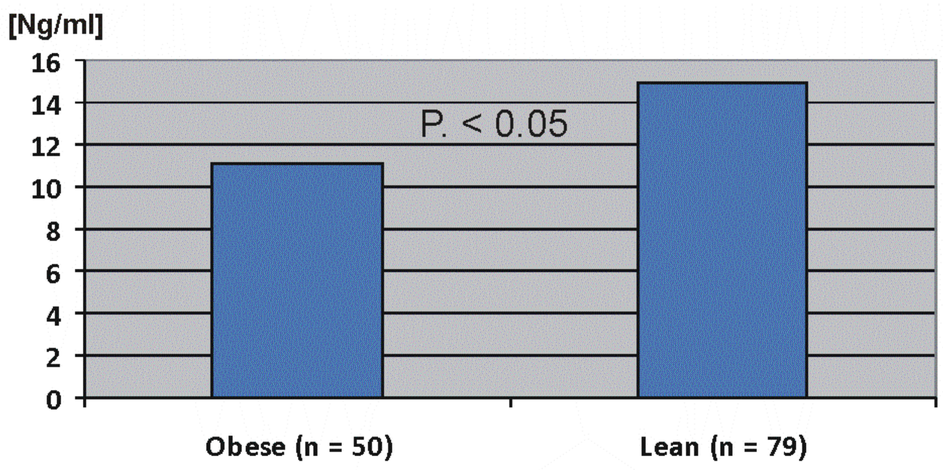
- Body composition was assessed by bioelectrical impedance analyzer (BIA):

•FAT - fat mass (kg/%)
•FFM - fat free mass (kg/%)
•PMM - predicted muscle mass (kg/%)
•TBW - total body water (kg/%)

RESULTS

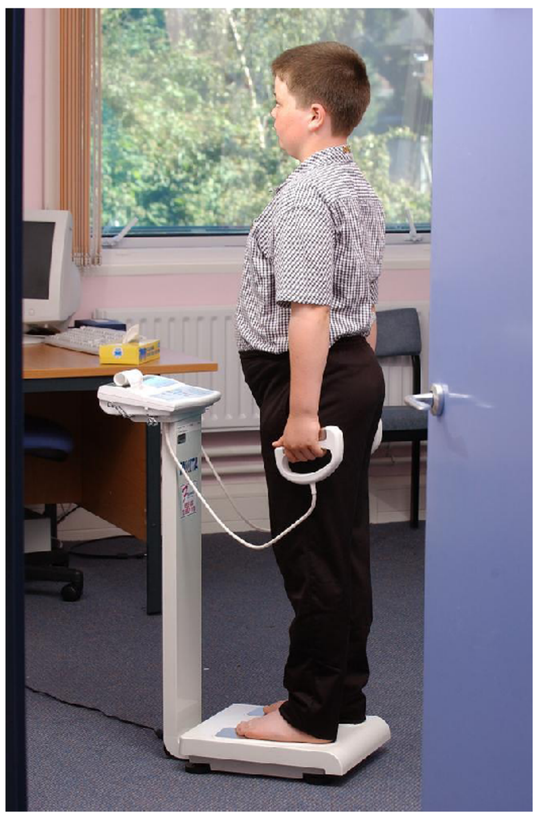
Differences between study and control groups

Parameter	Study group (n = 50) Mean±SD	Control group (n = 79) Mean±SD	P value
Age (years)	13.31 ± 2.79	12.97 ± 2.41	NS
BMI (kg/m^2)	31.3 ± 4.2	19.9 ± 3.0	< 0.0001
WHtR	0.61 ± 0.05	0.43 ± 0.04	< 0.0001
FFM%	62.9 ± 6.8	78.1 ± 5.1	< 0.0001
FAT%	37.1 ± 6.8	21.9 ± 5.1	< 0.0001
PMM%	59.9 ± 6.5	74.6 ± 5.1	< 0.0001
TAC [µmol/l]	151.5 ± 49	153.3 ± 29.5	NS
oxLDL [ng/ml]	526.29 ± 599.16	456.88 ± 502.37	NS
PerOx [nmol/min/ml]	60.66 ± 31.11	83.98 ± 16.52	< 0.0001
Leptin	22.72 ± 19.67	7.42 ± 5.83	< 0.0001



Significant correlation between bone markers vs. oxidative stress markers, leptin and body composition parameters

Total studied population N = 129		
oxLDL vs. NTx	r = 0.349	p < 0.001
BMI vs. osteocalcin	r = - 0.247	p < 0.01
Study group (obese) N = 50		
TAC vs. osteocalcin	r = 0.329	p < 0.05
oxLDL vs. NTx	r = 0.364	p < 0.05
Control group (lean) N = 79		
BMI vs. osteocalcin	r = - 0.269	p < 0.05
PerOx vs. NTx	r = - 0.320	p < 0.01
leptin vs. NTx	r = 0.245	p < 0.05
PMM% vs. NTx	r = - 0.252	p < 0.05
FAT% vs. NTx	r = 0.245	p < 0.05
FFM% vs. NTx	r = - 0.245	p < 0.05



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Disclosures: Nothing to declare

CONCLUSIONS

Bone turnover seems to be disturbed in the obese children and pathophysiological factor with can be involved in that mechanism may be an increase oxidative stress level. Osteocalcin and NTx levels seem to be related to the anthropometrical status and adipose tissue activity (leptin level).

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