

EVALUATION OF THE RELATIONSHIP BETWEEN SERUM URIC ACID LEVEL AND CARDIOMETABOLIC RISK IN OBESE CHILDREN AND ADOLESCENTS

Aslıhan Araslı Yılmaz¹, Nursel Muratoğlu Şahin¹, Elvan Bayramoğlu¹, Şervan Özalkak¹, Şenay Savaş Erdeve,¹Semra Çetinkaya¹,Zehra Aycan^{1,2}

1-Dr.Sami Ulus Maternity, Child Health and Diseases Training and Research Hospital, Pediatric Endocrinology Department

2-Ankara University Medicine Faculty, Pediatric Endocrinology Department

Introduction-Aim: In adult studies, serum uric acid level (SUA) has been shown to be associated with cardiometabolic anomalies of metabolic syndrome such as insulin resistance, hypertension, increased carotid intima thickness, and hyperuricemia is considered as an independent risk factor for atherosclerosis and cardiovascular disease. Early cardiovascular changes in obese children and studies on the relationship between metabolic syndrome and hyperuricemia are quite limited(1-3). In our study, it was aimed to evaluate the relationship between SUA level and obesity comorbidities in obese children and adolescents and cardiometabolic risk.

Methods:The records of 144 obese patients aged 10-18 years were evaluated retrospectively. According to age and sex, SUA level was <95 percentile group1 and SUA level was ≥95 percentile group 2. Body mass index (BMI), hypertension, lipid profile, insulin resistance, serum transaminases, hepatosteatosis, ambulatory blood pressure measurements (ABPM), and left ventricular hypertrophy based on the measurement of left ventricular mass in echocardiography were compared between the two groups.

Results:In group 2, BMI SDS, serum triglyceride, AST, ALT levels and hepatosteatosis were significantly higher, whereas HDL level was significantly lower. In OGTT, 60, 90 and 120.min glucose levels and 120 min insulin levels were significantly higher in Group2. No differences were found between groups HbA1C and HOMA-IR. When the presence of hypertension was evaluated; both office and ABPM measurements were significantly higher in group 2. Left ventricular hypertrophy was found in 38. 2 % of the cases in group 2 and the mean left ventricular mass index was significantly higher with $38.05 \pm 11.39g /m^{2.7}$.

Table 1. Characteristics of study population when grouped by serum uric acid level

Variable	Group 1	Group 2	p
Age	13,68±2,0	13,95± 2,25	0,452
Gender (Girls / Boys)	35/41	52/16	0,000*
Puberty			
-Prepubertal (N- %)	10(%13,2)	2(%2,9)	
-Mid pubertal (N- %)	30(%39,5)	27(%39,7)	0,247
-Post pubertal (N- %)	36(%47,3)	39(%57,4)	
BMI	33,84±4,12	35,26±4,99	0,068
BMI-SDS	2,94±0,68	3,22±0,82	0,029**
Fasting Serum Glucose (mg/dl)	90,56±9,69	91,47±10,68	0,597
Fasting Insulin (µIU/mL)	29,74±14,34	33,17±16,99	0,195
LDL-C (mg/dl)	164,77±40,97	169,13±36,47	0,504
Triglycerides (mg/dl)	100,19±33,51	103,75±31,71	0,514
Total Cholesterol (mg/dl)	133,26±58,10	158,88±66,22	0,015*
HDL-C (mg/dl)	41,33±7,04	36,82±8,04	0,001*
TG/HDL(atherogenic index)	3,38±1,84	4,55±2,88	0,001*
AST (IU/L)	24,27±10,05	29,75±17,07	0,017*
ALT (IU/L)	28,61±15,91	44,04±28,03	0,000*
Serum Uric Acid (mg/dl)	5,31±1,19	7,06±1,12	0,000*
HbA1C (%)	5,33±0,28	5,39±0,31	0,249
HOMA-IR	6,70±3,44	7,58±4,30	0,181
OGTT 0.min Glucose (mg/dl)	91,64±10,25	89,47±11,19	0,232
OGTT 30. min Glucose (mg/dl)	143,09±26,81	145,57±23,29	0,552
OGTT 60. min Glucose (mg/dl)	131,97±30,61	148,67±35,73	0,003*
OGTT 90. min Glucose (mg/dl)	123,69±25,52	137,0±33,51	0,016*
OGTT 120. min Glucose (mg/dl)	115,6±26,79	125,38±28,18	0,035*
OGTT 0.min insulin (µIU/mL)	31,07±28,35	32,01±15,95	0,128
OGTT 30. min insulin (µIU/mL)	168,55±89,35	182,0±97,02	0,390
OGTT 60. min insulin (µIU/mL)	152,62±93,66	167,91±101,1	0,350
OGTT 90. min insulin (µIU/mL)	124,16±85,74	145,99±86,59	0,131
OGTT 120. min insulin (µIU/mL)	102,46±66,72	140,54±114,73	0,018*
Hepatosteatosis			
-No	21 (%27,7)	9 (%13,2)	
-Grade 1	30 (%39,4)	17 (%25,0)	0,02*
-Grade 2	20 (%26,3)	26 (%38,3)	
-Grade 3	5 (%6,6)	16 (%23,5)	

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	Group 1	Group 2	P
Office systolic blood pressure(mmHg)	123,22±11,16	127,2±12,99	0,097
Office diastolic blood pressure (mmHg)	77,89±8,37	80,95±10,51	0,039*
Mean systolic blood pressure 24 hours (mmHg)	123,22±8,91	127,80±10,03	0,004*
Mean diastolic blood pressure 24 hours (mmHg)	69,39±6,69	75,50±11,61	0,03*
Mean Arterial Pressure (MAP) (mmHg)	83,65±9,38	89,17±10,68	0,001*
Daytime systolic blood pressure (mmHg)	125,71±10,12	130,51±10,04	0,006*
Daytime diastolic blood pressure (mmHg)	71,3±7,76	77,35±10,37	0,121
Night- time systolic blood pressure (mmHg)	39,5±23,62	48,02±27,94	0,052
Night-time diastolic blood pressure (mmHg)	28,47±24,95	35,27±27,46	0,713
Daytime systolic blood pressure load (%)	115,19±9,97	121,14±11,38	0,001*
Daytime diastolic blood pressure load (%)	63,00±8,44	69,35±13,42	0,012*
Night-time systolic blood pressure load	46,64±30,23	61,57±28,35	0,003*
Night-time diastolic blood pressure load	16,26±17,00	18,11±19,41	0,121
Dipper/Non dipper	34/42	43/25	0,026*
EKO (LVMI)	34,11±7,46	38,05±11,39	0,014*
LVH	11(%14,4)	26(%38,2)	0,001*

Conclusion:

The identification of children with a high risk of cardiometabolic is extremely important for the prevention of complications related to childhood obesity. We suggest that serum uric acid levels may be an early marker of obesity comorbidity and cardiovascular dysfunction in obese children and adolescents.

References

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