URIC ACID AND RISK FOR ATHEROSCLEROTIC DISEASE EARY IN LIFE

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Background

Increased uric acid is an independent risk factor for cardiovascular disease in obese adults and adolescents. The relationship between uric acid and atherosclerotic risk early in life is unknown.

Objectives

1) Investigate whether uric acid relates to carotid intima-media thickness (cIMT, a marker of preclinical atherosclerosis), in a rather large sample of school-age children.
2) Investigate the interaction of obesity status and fat distribution.

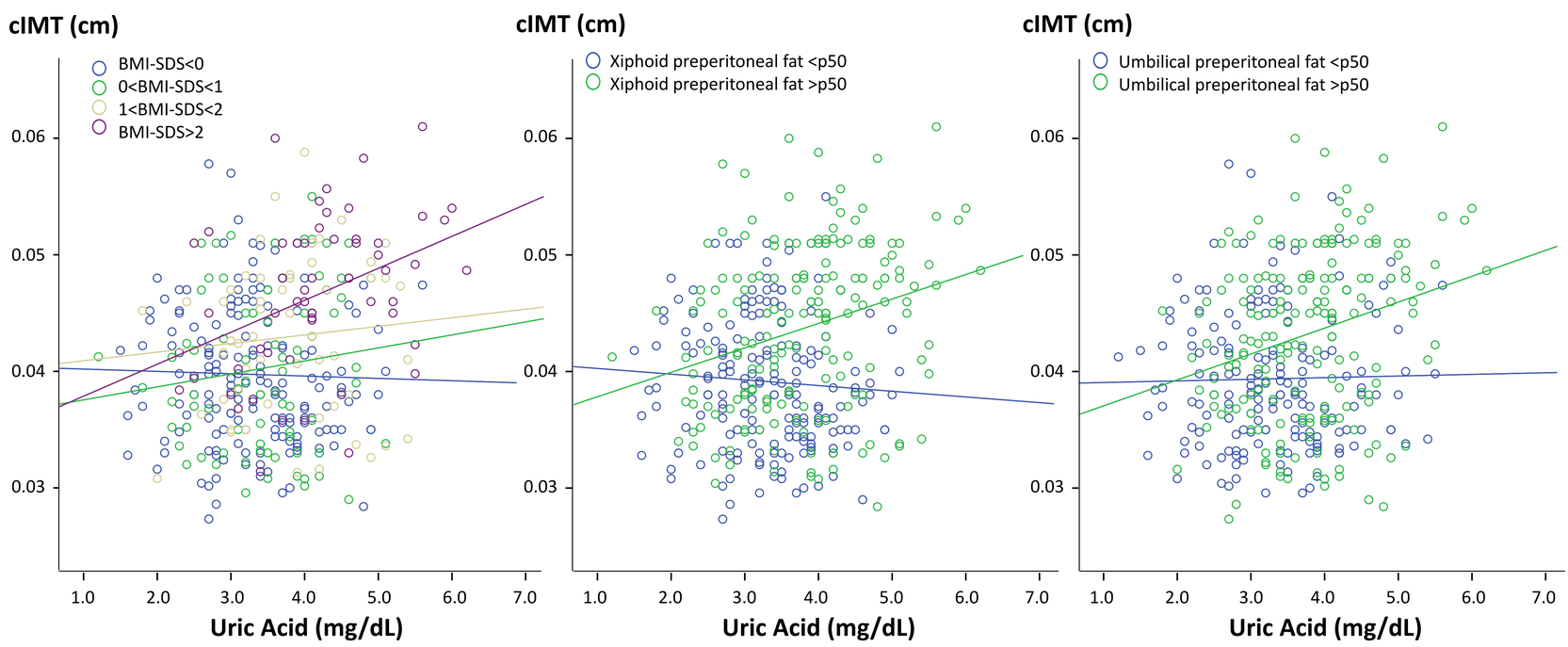
Methods

Subjects were 635 asymptomatic Caucasian children (330 boys and 305 girls; mean age 8.3 years), of whom, 405 were lean (250 with BMI-SDS<0 and 155 with 0≤BMI-SDS<1), 125 were overweight and 105 were obese. Serum uric acid levels, insulin (and HOMA index of insulin resistance [HOMA-IR]), C-reactive protein (CRP) and fasting lipids (triacylglycerol and HDL-cholesterol) were quantified is fasting serum samples. Body mass index (BMI), waist circumference, systolic blood pressure (SBP), and both abdominal fat and cIMT (by ultrasound) were also assessed.

Table 1. Correlation coefficients for uric acid and selected variables.

Uric Acid (mg/dL)	Subjects (n=635)	
	r	p
Clinical Assessments		
Age (yr)	0.296	<0.0001
Weight (Kg)	0.478	<0.0001
Height (cm)	0.403	<0.0001
BMI (kg/m^2)	0.416	<0.0001
Fat Mass (Kg)	0.417	<0.0001
Waist (cm)	0.472	<0.0001
SBP (mmHg)	0.263	<0.0001
Laboratory Assessments		
Insulin (mIU/L)	0.219	<0.0001
HOMA-IR	0.216	<0.0001
Triglycerides (mg/dL)	0.179	<0.001
HDL-cholesterol(mg/dL)	-0.168	<0.001
CRP (mg/L)	0.323	<0.0001
Ultrasonography Assessments		
Carotid IMT (cm)	0.218	<0.0001
Xiphoid preperitoneal fat (mm)	0.383	<0.0001
Umbilical preperitoneal fat (mm)	0.325	<0.0001

Figure 1. Correlations between serum uric acid and cIMT according to BMI categories and distribution of xiphoid and umbilical preperitoneal fat.



Conclusions

1) Increased serum uric acid is associated with cIMT in school-age children.
2) Both obesity and increased abdominal fat aggravate the risk of atherosclerotic disease imposed by higher uric acid.

Results

- Overweight and obese children had higher uric acid levels and higher cIMT than lean children ($p<0.0001$) [uric acid (mg/dL): 3.3±0.1 vs 4.0±0.1 vs 4.4±0.1 and cIMT (cm): 0.039±0.001 vs 0.040±0.001 vs 0.043±0.001 in lean, overweight and obese children respectively; $p<0.0001$].
- Uric acid was associated with several cardiovascular risk factors, namely lower HDL-cholesterol and higher HOMA-IR, C-reactive protein, triacylglycerol, BMI, waist, SBP, abdominal fat and cIMT (all $p<0.0001$).
- Both obesity and abdominal fat showed interactions in the association with cIMT, as uric acid was preferentially related to cIMT in obese children ($n=105$; $\beta= 0.396$, $p<0.0001$, $r^2=15.7\%$) and in children with higher preperitoneal fat (xiphoid: $\beta=0.263$, $p<0.001$, $r^2=11.9\%$; and umbilical: $\beta=0.287$, $p<0.001$, $r^2=14.1\%$).