

Carotid intima-media thickness relates to epicardial and perirenal fat rather than to total body adiposity in apparently healthy children

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Introduction

The **distribution of adipose tissue among visceral fat reservoirs** is more likely to be related to **cardiovascular diseases** than the total adipose tissue mass.

A previous study of our group reported that **perirenal fat is the main abdominal fat depot associated with cIMT**.

Epicardial fat, an index of cardiac visceral adiposity, is a **metabolically active fat depot** enclosed between the visceral layer of the pericardium and the myocardium.

There are limited data regarding the association of epicardial fat with cIMT in apparently healthy children.

Objectives

The aim of this study was to **determine whether epicardial and perirenal fat, but not body adiposity, are related to cIMT** in prepubertal children.



Material and methods

cIMT, epicardial and perirenal fat thickness (ultrasonography) and fat mass (bioimpedance) were assessed in 239 school-age Caucasian children [139 boys and 100 girls; mean age 8.9 ± 0.1 yr] included in a cross-sectional study of cardiovascular risk factors in prepubertal children in Northeastern Spain.

Results

Table 1. Clinical and ultrasonography assessments in the studied subjects as a whole and in subgroups thereof according to BMI (lean and obese).

	All children (n=239)	Lean (BMI-SDS <2) (n=150)	Obese (BMI-SDS ≥2) (n=89)
Clinical assessments			
Weight-SDS	1.4 ± 0.1	0.6 ± 0.1	2.7 ± 0.1***
Height-SDS	0.8 ± 0.1	0.6 ± 0.1	1.0 ± 0.1*
BMI-SDS	1.3 ± 0.1	0.5 ± 0.1	2.7 ± 0.1***
Fat mass (Kg)	16 ± 0.6	12 ± 0.6	23 ± 1***
Waist (cm)	72 ± 1	66 ± 1	83 ± 1***
Ultrasonography assessments			
Epicardial fat (cm)	0.29 ± 0.01	0.25 ± 0.01	0.35 ± 0.01***
Perirenal fat (cm)	0.22 ± 0.00	0.21 ± 0.00	0.24 ± 0.01***
cIMT (cm)	0.045 ± 0.000	0.045 ± 0.000	0.046 ± 0.001

*p<0.05, ** p<0.01 and *** p<0.001

Table 2. Lineal regression analyses for epicardial fat as dependent variable.

Epicardial fat	All children (n=239)			Lean (BMI-SDS <2) (n=150)			Obese (BMI-SDS ≥2) (n=89)		
	B	p	R ²	B	p	R ²	B	p	R ²
Fat mass	--	--	--	0.357	0.003	32.7	--	--	--
Waist	0.467	<0.0001	35.3	0.282	0.016	2.6	0.268	0.014	11.7
Perirenal fat	0.231	<0.0001	3.4	--	--	--	0.231	0.034	3.6
Total R²	38.7			35.3			15.3		

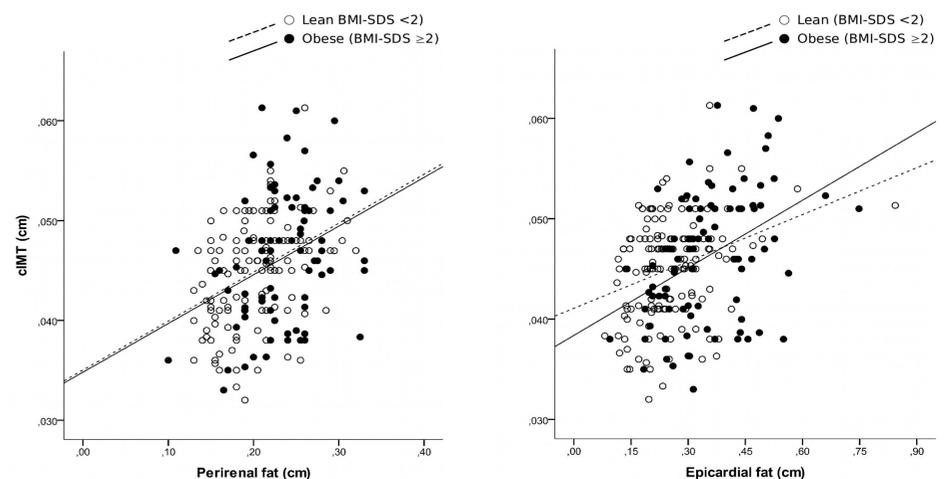
Non-predictive variables: age, gender, puberty, BSA, insulin and triacylglycerol

Table 3. Lineal regression analyses for cIMT as dependent variable.

cIMT	All children (n=239)			Lean (BMI-SDS <2) (n=150)			Obese (BMI-SDS ≥2) (n=89)		
	B	p	R ²	B	p	R ²	B	p	R ²
Epicardial fat	0.223	0.001	3.5	0.187	0.029	2.1	0.279	0.009	12.1
Perirenal fat	0.290	<0.0001	15.6	0.347	<0.0001	18.5	0.240	0.023	4.1
Total R²	19.1			20.6			16.2		

Non-predictive variables: age, gender, BSA, fat mass, waist, SBP, insulin and triacylglycerol

Figure 1: Scatter plots for perirenal and epicardial fat with children's cIMT. Filled dots and continuous line depict obese children (BMI-SDS ≥ 2) and open dots and discontinuous line depict lean children (BMI-SDS < 2).



Conclusions

- ✓ cIMT relates to epicardial and perirenal fat thickness, rather than to body adiposity, in healthy prepubertal children.
- ✓ Measurement of visceral fat thickness by ultrasonography may serve as a simple tool for cardiometabolic risk assessment in childhood.