The triglyceride-to-HDL cholesterol ratio is associated with insulin resistance in obese boys but not in obese girls

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BACKGROUND & AIMS

Children and adolescents with obesity often have insulin resistance (IR) and are at increased risk to develop coronary heart disease (CHD) in adulthood (Park et *al.,* 2012). The triglyceride to HDL-cholesterol (TG/HDL-C) ratio reflects small, dense low-density lipoprotein (LDL), an atherogenic lipoprotein that strongly predicts CHD (Onat *et al.,* 2010).

In this study we evaluated the TG/HDL-C ratio in obese children and adolescents and studied the relationship with age, the degree of obesity and IR.

METHODS

We retrospectively analysed data from 145 obese children and adolescents (71 girls; mean ± SD BMI SDS: 2.9 ± 0.4) aged 10 to 18 years (13.7 ± 1.8 yrs). Patients were classified as class I or simple obesity, class II or severe obesity and class III or morbid obesity according to the extended IOTF cut-offs (Bervoets & Massa, 2014).

Fasting plasma glucose, serum insulin, HDL-C and TG concentrations were measured. IR was assessed by the HOMA-IR.

RESULTS

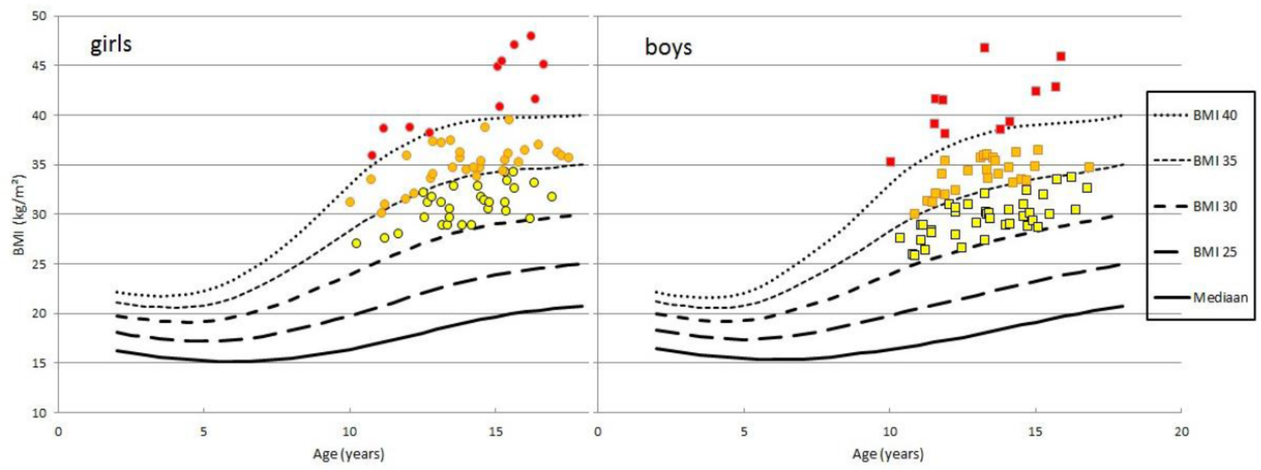

Figure 1. Patient characteristics. Age and BMI of the studied patients : 46% had class I or simple obesity, 38% class II or severe obesity and 16% class III or morbid obesity.

	Class I (n = 67)	Class II (n = 55)	Class III (n = 23)	p
Age (yrs)	13.7 ± 1.7	13.6 ± 1.8	13.7 ± 2.0	NS
BMI (SDS)	2.6 ± 0.2	3.0 ± 0.1	3.5 ± 0.2	< 0.001
Glucose (mg/dl)	94 ± 7	92 ± 6	96 ± 8	NS
Insulin (µU/ml)	20 ± 8	26 ± 12	31 ± 10	< 0.001
HOMA-IR	4.6 ± 2.1	6.1 ± 2.9	7.4 ± 2.6	< 0.001
HDL-C (mg/dl)	45 ± 10	42 ± 8	43 ± 9	NS
Triglycerides (mg/dl)	122 ± 67	121 ± 65	102 ± 59	NS
TG/HDL-C	1.3 ± 0.9	1.3 ± 0.8	1.1 ± 0.7	NS

Table 1. Biochemical and hormonal results as a function of the degree of obesity. HOMA-IR increased with increasing severity of obesity. No differences in lipid levels were found between the 3 classes of obesity.

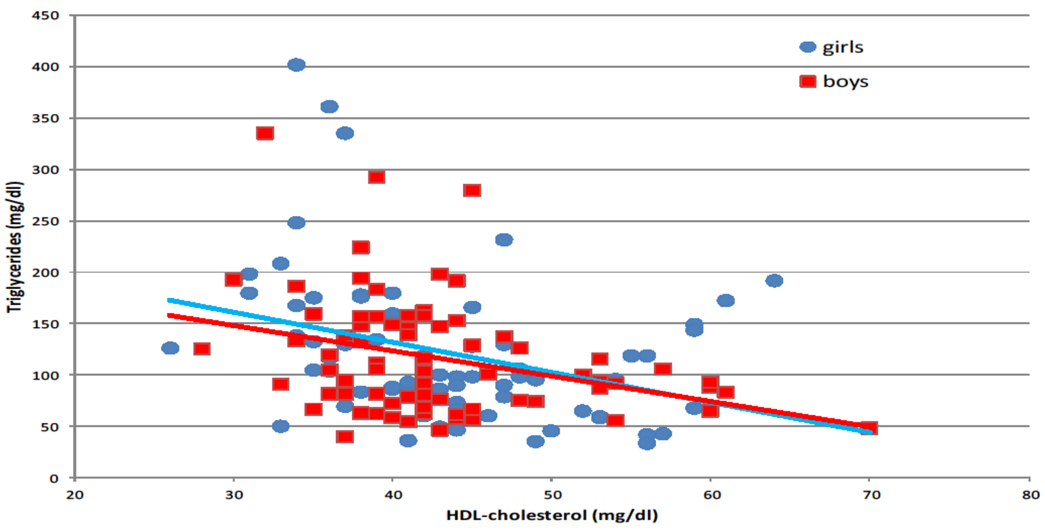

Figure 2. Relationship between serum triglycerides and HDL-C levels : girls : r = - 0.283, p = 0.017; boys r = -0.329, p = 0.004).

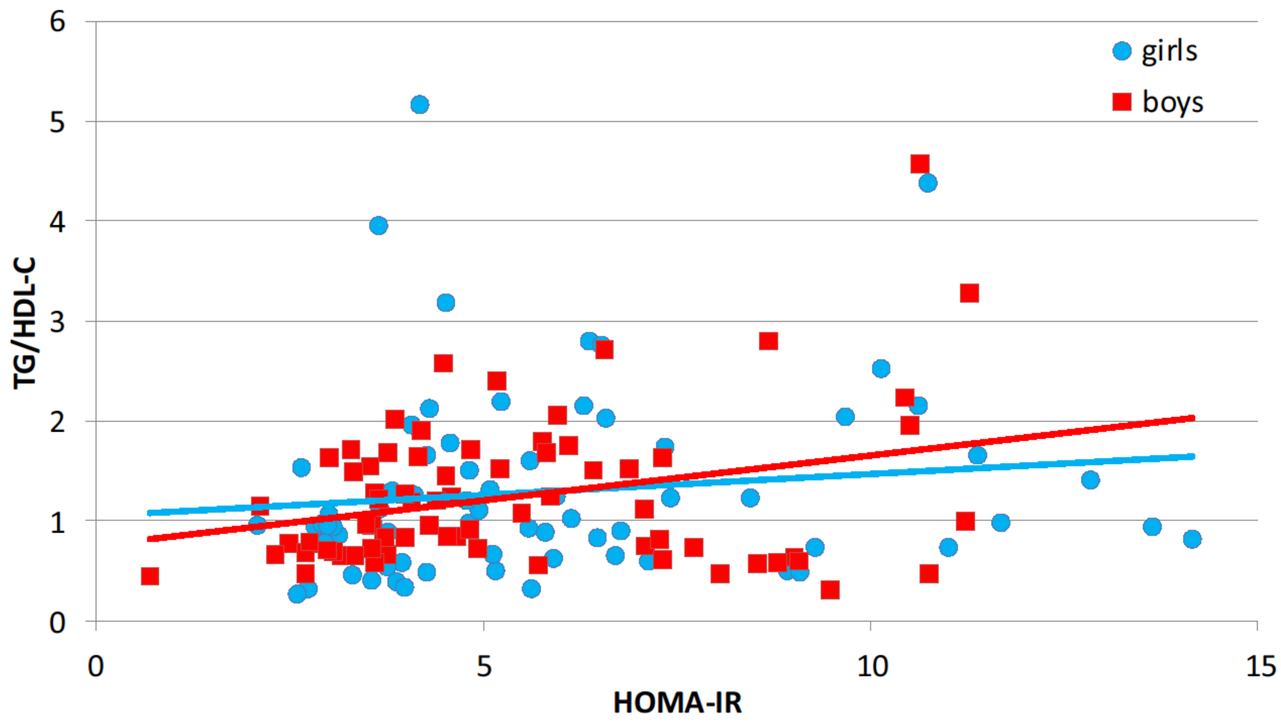

Figure 3. Relationship between TG/HDL-C ratio and HOMA-IR : girls : r = 0.129, p = 0.288; boys : r = 0.299, p = 0.010.

	TG/HDL-C ratio			
	girls	P	boys	P
Age (yrs)	0.113	NS	0.136	NS
BMI (SDS)	-0.048	NS	-0.081	NS
HOMA-IR	0.129	NS	0.299	0.01

Table 2. Correlation coefficients between TG/HDL-C ratio and age, BMI and HOMA-IR in obese girls and boys.

CONCLUSIONS

1. In obese children and adolescents the TG/HDL-C ratio is not associated with the degree of obesity nor with age.
2. The TG/HDL-C ratio is associated with the HOMA-IR in obese boys, but not in obese girls.
3. Our findings suggest that in obese boys the TG/HDL-C ratio may serve as a clinically useful determinant to identify those patients who are IR and at increased risk to develop future CHD.

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Fat 2

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