



The triglyceride-to-high density lipoprotein cholesterol ratio in overweight Korean children

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BACKGROUND

- The total cholesterol (TC) and non-high density lipoprotein cholesterol (non-HDL-C) are commonly used screening tools for identifying children with dyslipidemia.
- The triglyceride-to-high density lipoprotein cholesterol (TG/HDL-C) ratio has recently been reported as a marker of insulin resistance in obese children and adolescents.

OBJECTIVES

- To describe the TG/HDL-C ratio and related factors in overweight and normal weight Korean children
- To evaluate whether the high TG/HDL-C ratio is associated with metabolic risk factors in overweight Korean children.

METHODS

- Data from 769 Korean children (255 overweight children defined by BMI \geq 85th percentile, and 514 normal weight children) were retrospectively evaluated.
- Glucose, insulin, total cholesterol, HDL-C and TG levels were measured after overnight fasting, and TG/HDL-C ratio, non-HDL-C (TC - HDL-C) and homeostasis model assessment of insulin resistance (HOMA-IR, insulin (μ U/mL) \times glucose (mmol/L)/22.5) were calculated.

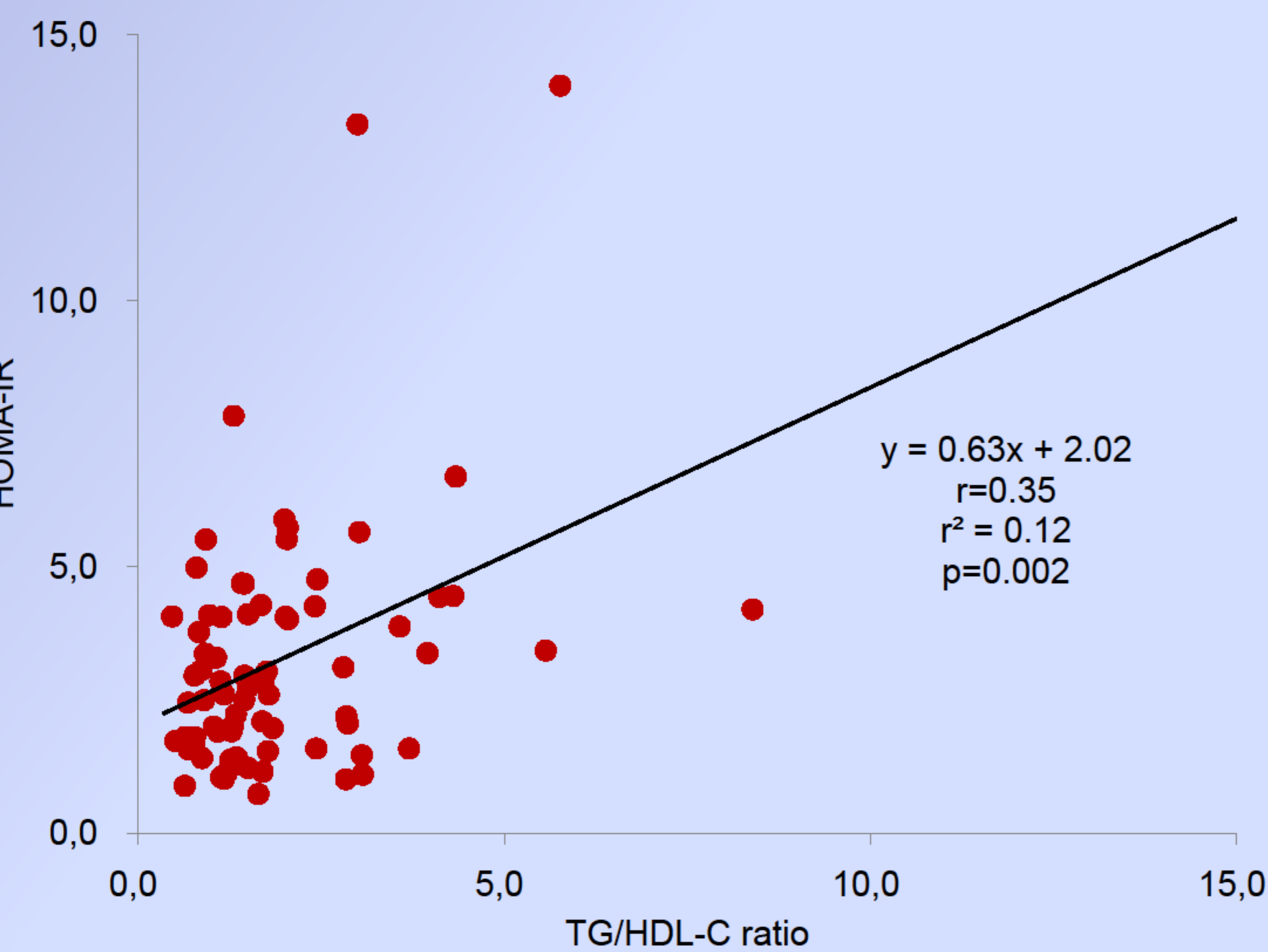


Figure 1. The correlation between triglyceride-to-high density lipoprotein cholesterol (TG/HDL-C) ratio and homeostasis model assessment of insulin resistance (HOMA-IR) in overweight children

CONCLUSIONS

- Waist circumference, systolic blood pressure, ALT, glucose and lipid profiles except for TC, LDL-C in overweight children were higher than those in normal weight children.
- In overweight children, moving from the lowest to the highest tertile of the TG/HDL-C ratio, although BMI SDS was not different, the levels of waist circumference, ALT, and HOMA-IR were increased.
- The high TG/HDL-C ratio is related with insulin resistance in overweight children.
- The TC and non-HDL-C is not a sensitive screening tool for identifying those with increased TG/HDL-C ratio.

RESULTS

Table 1. Characteristics of normal weight and overweight children

Characteristics	Normal weight (N=514)	Overweight (N=255)	P value
Female (%)	418 (81.3%)	178 (70.8%)	
Age (yr)	8.9 \pm 1.8	8.7 \pm 2.0	0.106
Height (cm)	135.5 \pm 10.2	138.1 \pm 11.8	0.003
Height SDS	0.3 \pm 1.0	0.9 \pm 1.0	<0.001
BMI(kg/m ²)	17.3 \pm 1.9	22.5 \pm 2.94	<0.001
BMI SDS	-0.02 \pm 0.8	1.7 \pm 0.5	<0.001
Waist Circumference	69.1 \pm 7.1 (n=25)	79.2 \pm 10.0 (n=77)	<0.001
SBP(mm/Hg)	104.3 \pm 8.8 (n=30)	109.7 \pm 9.7 (n=127)	0.006
DBP(mm/Hg)	58.0 \pm 8.5(n=30)	61.3 \pm 9.8 (n=127)	0.092
ALT(IU/L)	14.9 \pm 6.5	22.6 \pm 20.1	<0.001
Glucose(mg/dL)	95.8 \pm 6.8	96.9 \pm 6.9	0.027
Total cholesterol(mg/dL)	170.3 \pm 29.8	172.3 \pm 29.0	0.053
HDL-C(mg/dL)	58.6 \pm 11.2	53.0 \pm 11.3	<0.001
Non-HDL-C(mg/dL)	111.7 \pm 27.9	119.3 \pm 27.6	<0.001
Triglycerides (mg/dL)	74.2 \pm 36.3	100.0 \pm 26.7	<0.001
LDL-C(mg/dL)	96.9 \pm 26.4	100.1 \pm 26.7	0.117
TG/HDL ratio	1.4 \pm 0.9	2.0 \pm 1.9	<0.001
HOMA-IR	2.4 \pm 1.6 (n=32)	3.3 \pm 2.3 (n=74)	0.067

Table 2. Metabolic parameters of overweight children according to tertiles of TG/HDL-C ratio

Characteristics	TG/HDL-C ratio tertile			P value
	<1.17 (n=84)	\geq 1.17 and <2.0 (n=81)	\geq 2.0 (n=90)	
BMI (kg/m ²)	21.9 \pm 2.6	22.6 \pm 2.9	22.9 \pm 3.1	0.074
BMI SDS	1.6 \pm 0.5	1.7 \pm 0.5	1.7 \pm 0.6	0.361
Waist circumference (cm)	75.9 \pm 9.1 (n=30)	78.8 \pm 8.6 (n=24)	83.2 \pm 10.6 (n=22)	0.028
SBP (mm/Hg)	108.6 \pm 10.9 (n=39)	109.8 \pm 8.6 (n=41)	110.7 \pm 9.6 (n=47)	0.627
DBP (mm/Hg)	58.9 \pm 10.1 (n=39)	62.4 \pm 10.9(n=41)	62.4 \pm 8.1 (n=47)	0.183
ALT (IU/L)	18.9 \pm 11.8	21.2 \pm 10.6	27.2 \pm 29.6	0.018
Glucose (mg/dL)	97.1 \pm 8.2	97.2 \pm 6.4	96.6 \pm 6.0	0.858
Total cholesterol (mg/dL)	171.8 \pm 23.2	173.2 \pm 30.4	171.9 \pm 23.5	0.939
HDL-C (mg/dL)	61.5 \pm 11.1	53.3 \pm 7.3	44.8 \pm 8.3	<0.001
Non-HDL-C (mg/dL)	110.3 \pm 29.4	119.9 \pm 27.9	127.1 \pm 23.1	<0.001
Triglyceride (mg/dL)	50.5 \pm 10.8	81.0 \pm 14.8	152.1 \pm 76.1	<0.001
LDL-C (mg/dL)	100.2 \pm 28.8	103.7 \pm 27.7	96.7 \pm 23.6	0.224
HOMA-IR	2.5 \pm 1.0 (n=21)	2.5 \pm 1.6 (n=26)	4.5 \pm 3.2 (n=25)	0.004

Table 3. Sensitivity and specificity of total cholesterol and non-HDL-C for identifying high TG/HDL-C ratio* in overweight children

	Sensitivity (%)	Specificity (%)
Total cholesterol \geq 200 mg/dL	11.1	79.4
Non-HDL-C \geq 145 mg/dL	20.0	86.1

* : TG/HDL-C \geq 2.0

References

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