Metabolic risk assessment in obese children using Hypertriglyceridemic waist (HTGW) phenotype. Can it be a useful screening marker?

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AIMS

This study was conducted to assess the prevalence of Hypertriglyceridemic Waist phenotype (HTGW) among overweight and obese Greek children. Furthermore, to investigate whether HTGW phenotype could be used as a screening marker to detect children in risk of Insulin Resistance, Hypertension and NAFLD.

METHODS

172 children (83 males), mean age 9.7 years (SD=2.5 years), 95.9% obese, were analyzed.

➤ TyG [triglycerides (mg/dl) × fasting glucose (mg/dl)/2] and HOMA indices were used as predictors of insulin resistance.

➤HTGW phenotype was defined as waist circumference (WC) > 90th CDC percentile and triglyceride levels ≥100 mg/dl for children 0 to 9 years of age and ≥ 130 mg/dl for 10 to 19 years old.

➤ Elevated arterial pressure was defined as SAP or DAP ≥ 90th percentile.

➤Alanine aminotransferase ALT ≥ 25.8 U/L (boys) and 22.1 U/L (girls), was defined as abnormal in this study, indicating suspected fatty liver.

RESULTS

❖ 43.2% of the children had waist circumference above the 90th percentile
❖ 20.9% had elevated triglycerides.

❖HTGW phenotype was present at 16.3% of the sample.

❖No gender or age differences were found among children with HTGW.

❖Significantly lower levels of HDL were found in cases with HTGW (HDL mean 52.19 SD=11.69 for those without HTGW and 42.54 SD=8,65 for those with HTGW) (p<0.001).

❖ WHtR ratio was significantly greater in cases with HTGW mean 0.61, SD=0.05 vs mean 0.63 SD=0.04 (p=0.007).

❖Mean TyG was 8.79 (SD=0.32) for those with HTGW and 8.0 (SD=0.37) for those without HTGW (p<0.001)

❖Subjects with HOMA-IR ≥ 2.5 had a greater proportion of HTGW (23.4% vs. 8.8%, p=0.030).

❖SAP and DAP did not differ in the presence of HTGW, while subjects with and without elevated blood pressure where not different in the presence of HTGW (p=0.596).
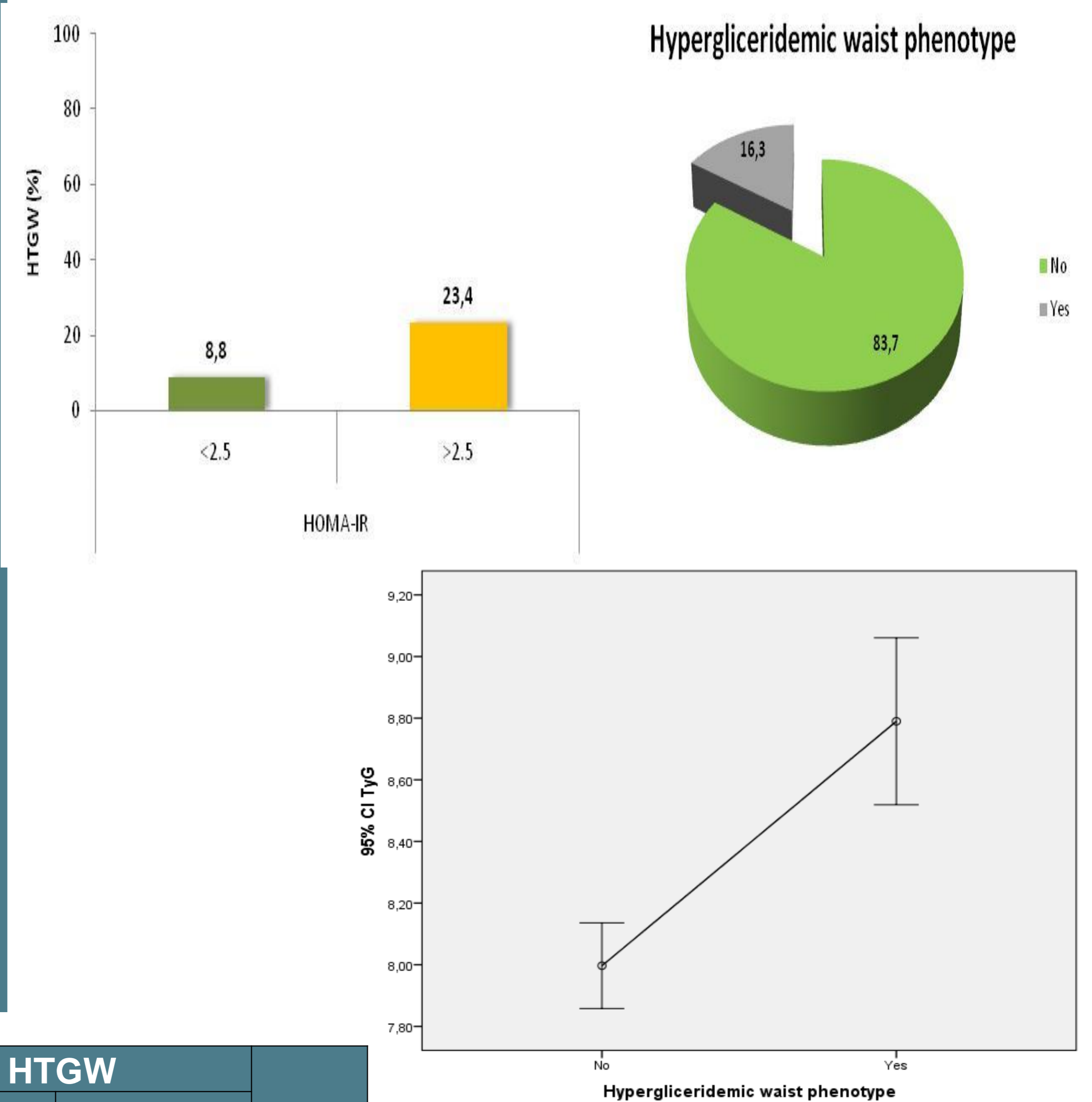
❖Elevated ALT was not found to be associated with the presence of HTGW (p=0.316).

		N	%
SEX	BOYS	83	48.3
	GIRLS	89	51.7
▲ ALT	NO	94	66.7
	YES	47	33.3
BMI (kg/m 2)	OVERWEIGHT	7	4,1
	OBESE	165	95.9
AP>90th	NO	96	56.8
	YES	73	43.2
WtH ratio	<0.5	4	2.3
	>0.5	168	97.7
HOMA-IR ≥2.5	<2.5	57	47.1
	≥2.5	64	52.9
HTGW phenotype	NO	144	83.7
	YES	28	16.3

		HTGW phenotype				P Pearson's x2 test
		NO		YES		
		N	%	N	%	
SEX	BOYS	71	85.5	12	14.5	0.52
	GIRLS	73	82.0	16	18.0	
▲ALT	NO	82	87.2	12	12.8	0.316
	YES	38	80.9	9	19.1	
BMI (kg/m 2)	OVERWEIGHT	7	100.0	0	0.0	0.600*
	OBESE	137	83.0	28	17.0	
AP>90th	NO	80	83.3	16	16.7	0.596
	YES	63	86.3	10	13.7	
WtH ratio	<0.5	4	100.0	0	0.0	1.000*
	>0.5	140	83.3	28	16.7	
HOMA-IR ≥2.5	<2.5	52	91.2	5	8.8	0.030
	≥2.5	49	76.6	15	23.4	

Hypergliceridemic waist phenotype

CONCLUSION

High prevalence of HTGW phenotype was detected among overweight and obese children and it was significantly and positively correlated with insulin resistance, as well as with lower HDL levels.
Therefore, it could be a useful marker for early detection of children in risk of developing metabolic syndrome.

	HTGW				
	No		Yes		P t-test
	Mean	SD	Mean	SD	
TyG	8.00	0.37	8.79	0.32	<0.001

1. Diabetes Metab Syndr Obes. 2017; 10: 385–391.

2. J Pediatr Gastroenterol Nutr.2013;56(1):99.

3. 2017 AAP guidelines for screening and managing pediatric high BP (August 2017)

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Fat, metabolism and obesity
Eirni Dikaiakou
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