

## Introduction

Increased glycaemic variability (GV) (short-term fluctuations in blood glucose level) is associated with increased oxidative stress, vascular complications and mortality in diabetic and prediabetic patients.

## Aim

To investigate the relationship between GV and inflammatory markers in obese children with metabolic syndrome (MS) and insulin resistance (IR).

## Materials-Methods

Fifty obese adolescents with insulin resistance were included in the study. Insulin resistance was diagnosed according to the results of oral glucose tolerance test (OGTT). All patients underwent anthropometric measurements, body fat analysis and subcutaneous continuous glucose monitoring (SCGM) for 24 hours. Serum lipid, adiponectin and interleukin-6 (IL-6) levels were measured. Glycaemic variability coefficient (GVC) was calculated using the standard deviation and the average glucose value obtained by SCGM. MS was diagnosed according to the modified World Health Organization and the International Diabetes Federation criteria.

## Results

Twenty-seven of the patients had MS and the remaining had only IR. Body fat mass, HbA1c and peak insulin levels in the OGTT were significantly higher in patients with MS than the group without MS. IL-6 levels were significantly higher in the group with MS, but there was no difference in adiponectin levels. There was a significant positive correlation between GVC and HOMA-IR; fasting, peak and total insulin levels. When ROC analysis was used to determine the best sensitivity and specificity value for IL-6 and adiponectin in the diagnosis of MS, the best sensitive (%70,4) and specific (82.6%) value for IL-6 was 1.41 (pg / mL x 2) but there were no significant expression of adiponectin values.

Table 1. Clinical and laboratory characteristics of patient with (+) or without (-) metabolic syndrome

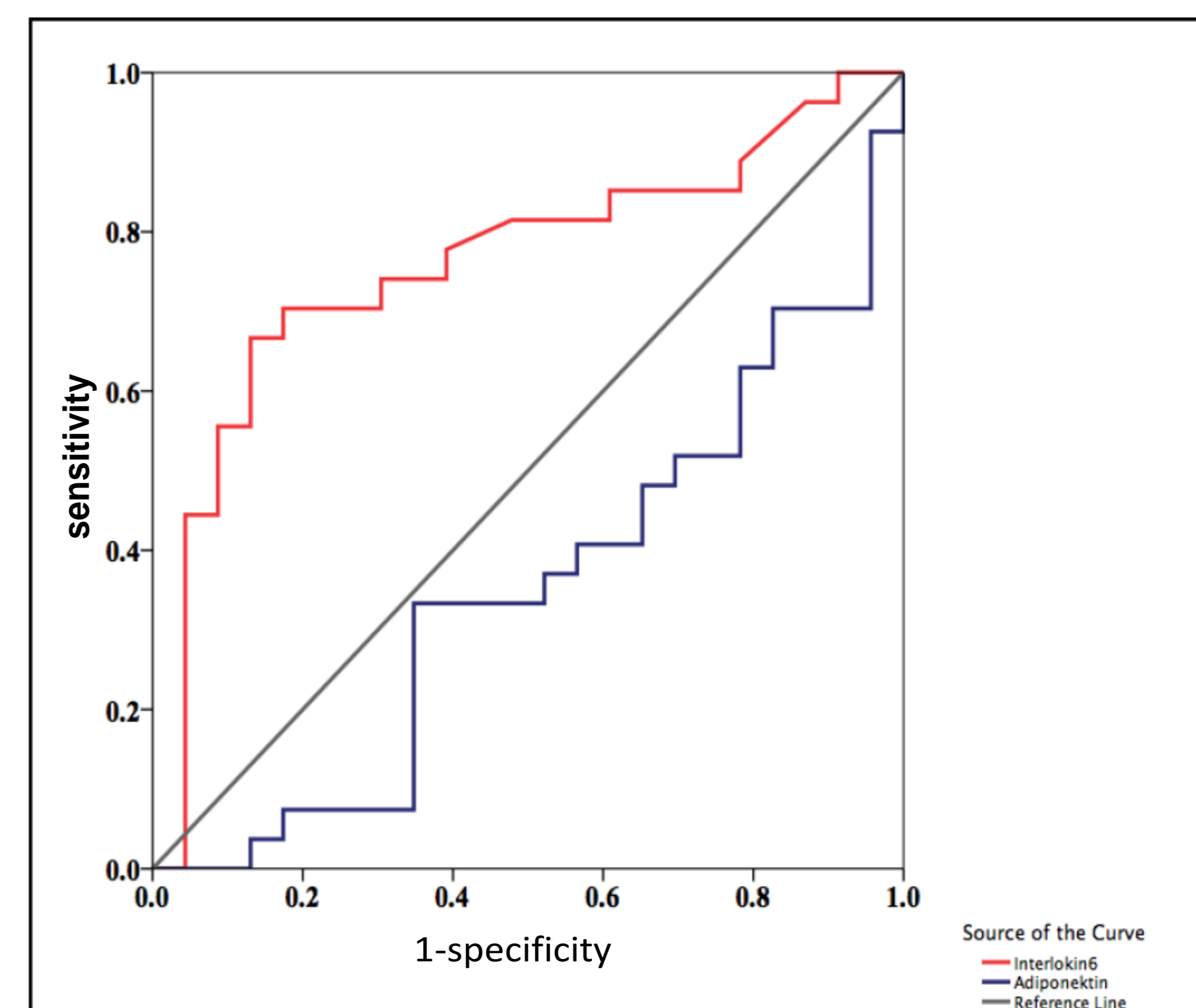
Variables	MS (-) (n=23) (%46)	MS(+) (n=27) (%54)	p-value*
Males/females %	47.8/52.2	29.6/70.4	0.045
Age (years)	13.9±2.3	13.9±2.3	0.947
Systolic blood pressure (mmHg)	117.0±9.1	134.9±11.4	0.001
Diastolic blood pressure (mmHg)	72.7±6.8	86.1±10.0	0.001
Acanthosis Nigricans n (%)	19 (82.6)	25 (92.5)	0.096
<b>Anthropometric measurements</b>			
Body weight (sd)	4.7±1.8	5.4±2.1	0.131
BMI (percentiles)	99.7±0.3	99.8±0.2	0.090
Waist circumference (cm)	104.3±9.0	108.4±11.5	0.167
Fat %	39.7±7.4	42.6±6.1	0.147
Fat mass (kg)	34.3±10.2	40.8±11.2	0.044
<b>Biochemical parameters</b>			
Total cholesterol (mg/dl)	169.5±36.8	167.1±41.8	0.835
Triglycerides (mg/dl)	97.7±27.7	148.7±73.7	0.002
HDL cholesterol (mg/dl)	48.2±9.8	38.7±6.2	0.001
LDL cholesterol (mg/dl)	101.8±31.9	98.7±38.5	0.752
Uric acid (mg/dl)	5.4±1.0	5.9±1.2	0.221
ALT (mg/dl)	34.9±34.4	24.4±12.6	0.176
AST (mg/dl)	28.3±14.3	25.7±8.4	0.455
HbA1c (%)	5.2±0.2	5.5±0.3	0.020
IL-6 (pg/ml)	3.0±10.2	4.7±6.5	0.002
Adiponectin (ng/ml)	12810±8675	8992±3976	0.069

MS: metabolic syndrome, BMI: body mass index, \*p<0.005

Table 3. Correlations between clinical and laboratory variables with adiponectin, IL-6 and mean glycaemic variability

	Adiponectin (ng/ml)		Mean GV (%)	
	r	p-value	r	p-value
WC (cm)	-0.432	0.002	Plasma insulin (mIU/L)	
BMI (percentiles)	-0.316	0.025	Basal	0.303 0.032
Fat mass (kg)	-0.425	0.002	2 h post-load	0.315 0.026
Triglycerides (mg/dl)	-0.359	0.010	Peak insulin	0.280 0.049
	IL-6 (pg/ml)		Total insulin	0.291 0.041
	r	p-value	Plasma glucose (mg/dl)	
Body weight (sd)	0.415	0.003	2 h post-load	0.281 0.048
HbA1c (%)	0.390	0.005	HOMA-IR	0.303 0.032
Triglycerides (mg/dl)	0.353	0.012	BMI (percentiles)	0.279 0.049

MS: metabolic syndrome, WC : waist circumference, BMI: body mass index, GV: glycaemic variability, HOMA-IR: homeostatic model assessment-insulin resistance



## Conclusion

This study suggests that there may be a relationship between GV and insulin resistance parameters such as HOMA-IR, fasting insulin, peak and total insulin values in OGTT. IL-6 levels are higher in obese children with MS than without MS.