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## BACKGROUND

Acanthosis nigricans (AN) is known to be common dermatologic manifestation in obese children and adolescents. The aim of this study is to examine the association of AN and insulin resistance in obese children and adolescents.

## METHOD

- ✓ One hundred seventy-nine obese subjects aged 6-17 years who participated in the intervention study, Childhood and Adolescents Obesity via Activity and Nutrition (ICAAN) study, were enrolled in 2017.
- ✓ AN was diagnosed by physician.
- ✓ Anthropometric measurements and blood sampling including fasting glucose, insulin, aspartate transaminase (AST), alanine transaminase (ALT), and leptin levels were assessed. Homeostasis model assessment of insulin resistance (HOMA-IR) was calculated from FPG and insulin using the equation.

## ICAAN study

- ✓ Multidisciplinary intervention program for obese children and adolescents in Korea (duration : 24months)
- ✓ Funding source : Korean Centers for Disease Control and Prevention & National research Institute of Health (2016-ER640501)

## RESULTS

- ✓ One hundred ten of subjects were male (61.5%). Eighty-four subjects (48.3%) had AN. The ratio of severe obesity was significantly higher in AN group than non-AN group (24.2% vs. 48.8%, p=0.001). Mean BMI, ALT, rGT, HOMA-IR, and leptin levels were significantly higher in AN group. HOMA-IR and level of leptin increased with severity of AN.

Table 1. General characteristics according to status of AN.

	Without AN (n=95)	With AN (n=84)	P-value
Age (yrs)	10.64±2.37	11.62±1.82	0.007
Sex, female, n(%)	42 (44.2)	27 (32.1)	0.12
Waist circumference (cm)	85.09±9.61	93.35±10.01	<0.001
BMI (kg/cm <sup>2</sup> )	27.03±3.23	30.42±3.76	<0.001
SBP (mm Hg)	117.28±15.42	120.65±13.46	0.17
DBP (mm Hg)	68.67±9.27	70.04±8.62	0.31
Triglyceride (mg/dl)	104.63±49.57	112.02±48.45	0.32
HDL (mg/dL)	51.88±11.40	49.11±11.74	0.11
LDL (mg/dL)	110.08±24.69	111.57±23.48	0.68
Fasting insulin (mU/L)	16.77±6.68	25.27±12.94	<0.001
HOMA-IR	3.63±1.52	5.53±2.85	<0.001
AST (IU/L)	24.17±14.66	30.94±21.41	0.02
ALT (IU/L)	25.25±29.80	47.96±46.89	<0.001
rGT (IU/L)	19.36±8.85	29.43±20.21	<0.001
Leptin (ng/mL)	28.91±14.13	34.92±15.55	0.008

Values are presented as mean±standard deviation for continuous variables  
P-value by independent t-test for continuous variables and by  $\chi^2$  test for categorical variables.



Table 2. Comparison of HOMA-IR and leptin in terms of AN severity

	AN grade 0 (n=95)	AN grade 1 (n=26)	AN grade 2-3 (n=39)	AN grade 4 (n=19)	P for trend
HOMA-IR*	3.62±1.05	3.83±1.19	4.52±1.07	5.77±1.11	<0.001
Leptin (ng/mL)*	26.13±1.05	25.84±1.10	32.30±1.08	40.94±1.13	0.001

Values are presented as mean±standard error, ANCOVA adjusted for age, sex, and BMI  
\* HOMA-IR and leptin were log-transformed prior to the analysis.

### Abbreviations

AN: acanthosis nigricans, BMI: body mass index, SBP: systolic blood pressure, DBP: diastolic blood pressure, TG: triglyceride, HDL: high density lipoprotein, LDL: low density lipoprotein, HOMA-IR: homeostatic model assessment, AST: aspartate aminotransferase, ALT: alanine aminotransferase

## CONCLUSIONS

Early identification of AN in obese children and adolescent can be recommended for screening of insulin resistance.

