

Blood Pressure, Blood Insulin, and Anthropometry in Obese Children

A Preliminary Report

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INTRODUCTION

Insulin has been hypothesized to play a role in the pathogenesis of hypertension in obese children, but the data are contradictory. Kanai *et al.* showed that fasting insulin levels explained 36% and 19% of the variance in systolic (SBP) and diastolic blood pressure (DBP), respectively ($p < 0.0001$).¹ The contribution of insulin to blood pressure persisted after correcting for age, weight (Wt), and body mass index (BMI). However, Horswill and Zipf² found that insulin had a weaker contribution to SBP ($R^2 = 0.19$, $p < 0.05$) and none to DBP ($p = \text{ns}$); moreover, the contribution of insulin to SBP disappeared after correcting for age and weight. In this study, we tested whether (1) fasting insulin levels are associated with BP in obese children and, (2) this relationship is influenced by anthropometry.

SUBJECTS AND METHODS

Three-hundred fifty obese children (178 female and 172 male) aged 9.9 ± 2.8 (mean \pm SD; range: 2.9–17.2) years were consecutively enrolled in the study on their first visit to a Pediatric Endocrinological Service. Obesity was diagnosed on the basis of a relative weight for age greater than 120%, and hypertension on the basis of a value of SBP and/or DBP over the 95th percentile for age after adjustment for height.³ TABLE 1 gives the main characteristics of the children.

RESULTS

Fifty-eight percent of the children were hypertensive. The values of insulin were significantly higher in hypertensive children than in children with normal BP (16 vs. 14 mU/mL, geometric mean, $p < 0.05$), but the difference was not clinically relevant.

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TABLE 1. Characteristics of the 350 obese children^a

Age (years)	9.9 ± 2.8
Pubertal status (prepubertal/early pubertal/late pubertal; %)	55/27/18
Wt (kg)	55.2 ± 16.9
Ht (m)	1.42 ± 0.15
RWt (%)	160 ± 27
BMI (kg/m ²)	26.5 ± 3.8
Insulin (μU/mL)	15 ^b
SBP (mm Hg)	118 ± 15
DBP (mm Hg)	76 ± 10

ABBREVIATIONS: Wt, weight; Ht, height; RWt, relative weight; BMI, body mass index; SBP, systolic blood pressure; DBP, diastolic blood pressure.

^aData are given as mean ±SD unless stated otherwise.

^bGeometric mean.

Log-transformed insulin explained only 7% and 4% ($p < 0.0001$) of the variance of SBP and DBP, respectively. The regression was not influenced by sex and pubertal status ($p = \text{ns}$, ANCOVA), and its residuals were uncorrelated with age ($p = \text{ns}$). However, after adjusting for Wt or BMI, insulin was no longer correlated with SBP and DBP ($p = \text{ns}$).

CONCLUSION

We conclude that (1) a very weak association exists between BP and insulin in obese children, and (2) this association disappears when the effects of Wt or BMI are taken into account.

REFERENCES

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