P-055 I – Determinants for insulin secretory capacity and insulin resistance in a rural Japanese area, Okinawa

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Background

Previous reports on insulin levels after an oral glucose load were controversial; some showed a progressive decline of insulin levels in subjects with normal glucose tolerance, impaired glucose tolerance (IGT) and diabetes, whereas others indicated an increase of insulin levels in IGT and diabetes compared to normal glucose tolerance, during the development from normal glucose tolerance to type 2 diabetes mellitus. Determinants for insulin secretory capacity and insulin resistance might be multifactorial, but precise studies have not been performed.

Purpose

To measure determinants for insulin secretory capacity and insulin resistance in a rural Japanese area, Okinawa

Methods

We continuously recruited 1051 men (mean age 49.2 years) and 895 women (mean age 50.0 years), aged from 30 to 79 years, and compared metabolic parameters, insulin response to an oral glucose load and abdominal fat distribution by CT tomography.

Results

According to body mass index (BMI: kg/m²), patients were classified to four groups, BMI < 25, 25 ≤ BMI < 27.5, 27.5 ≤ BMI < 30, 30 ≤ BMI. Visceral fat area (VFA) in each group of subjects was more (129 vs. 136 vs. 150 vs. 216) than estimated by body weight (BW) or body mass index (BMI). Pearson's correlation analysis showed that I₁₂₀ was positively correlated with BW (r=0.348, p=0.047), BMI (r=0.339, p=0.053), waist circumference (W) (r=0.469, p=0.012), and VFA (r=0.619, p=0.011) in the group of BMIs < 25, however I₀ and HOMA-IR were not. I₁₂₀ was not correlated with BW, BMI, W, and VFA in the group of 25 ≤ BMI < 27.5 and 27.5 ≤ BMI < 30, but was correlated with BW (r=0.297, p=0.063) and W (r=0.507, p=0.002) in 30 ≤ BMI.

Fig. 1. Responses in plasma glucose and insulin level during 75g oral glucose load

Fig. 2. Visceral fat area was positively correlated with BMI.

Fig. 3. I₁₂₀ is positively correlated with body weight and waist circumference

Fig. 4. I₁₂₀ is positively correlated with BMI even in non-obese subjects

Fig. 5. I₁₂₀ is positively correlated with visceral fat area (VFA)

I₁₂₀ is positively related with

	r	p
BMI	0.339	0.053
Waist	0.469	0.012
VFA	0.619	0.011

VFA>Waist>BMI

Fig. 6. Visceral adiposity is associated with delayed hyperinsulinemia in our non-obese subjects.

Conclusion

We observed that our patients had a higher response of plasma insulin at 2 hours after an oral glucose load (I₁₂₀), however Japanese subjects with impaired glucose tolerance was previously reported to be lower insulin response compared to those of the European and American people. Visceral adiposity is associated with delayed hyperinsulinemia in obese subjects but also in non-obese subjects.