

Improved Clinical and Laboratory Changes After 12 Months of Use of Metformin in Obese Insulin Resistant Children and Adolescents

DUARTE N.F.V., FRANCO N.C.F., RACHID L.R.O., COMINATO L., FRANCO R.R., DAMIANI D.

Children's Institute, University of São Paulo, Brazil

BACKGROUND

Childhood obesity is one of the most prevalent and challenging health care concerns. In this context, insulin resistance (IR) is an important disorder with strong association with metabolic (type 2 diabetes, hypercholesterolemia) and cardiovascular (hypertension, atherosclerosis) outcomes.

Clinical trials have showed Metformin as an effective drug on reducing the IR and body mass index (BMI). However, there is little data on use of metformin in children and adolescents.

METHOD

A retrospective study was made with 50 of our children and adolescents followed in the Pediatric Endocrinology Clinic ICR-FMUSP, due to obesity and IR, at baseline and after a year of use of metformin. Data were analyzed using MiniTab® 17.0 version.

Metformin dosage varied from 500 to 2000 mg per day. Mean age 12.4 ± 2.2 (8-17years), without gender predominance.

Clinical (weight, height, BMI, blood pressure) and biochemical (fasting glucose, insulin, lipid profile) data was analyzed. IR was measured by HOMA-IR. Exclusion criteria: T2DM, Neurological disorders with or without mental impairments and use of other weight related medications.

RESULTS

As a primary outcome, an increase in Insulin sensitivity was observed, measured by HOMA-IR (baseline: 4.7 ± 2.5 , 12 months: 3.56 ± 1.8 ($p=0.005$ (95%; 0.46 – 1.95) as well as a decrease in Fasting insulin (baseline: 23 ± 9.5 $\mu\text{U/ml}$, 12 months: 17.3 ± 9.1 $\mu\text{U/ml}$, $p<0.001$ (95%; 3.07 – 9.1).

It was also noticed that fasting glucose decreased from 86mg/dl ($\text{SD} \pm 6.9$) to 82mg/dl ($\text{SD} \pm 6.2$), $p=0.002$ (95%; 1.4 – 5.05) – graphic 1C.

As patients were still growing longitudinally, BMI Z-score was used for the analysis: 3.2 kg/m² ($\text{SD} \pm 0.67$) at the beginning and 2.9 kg/m² ($\text{SD} \pm 0.58$) after 12 months of treatment (Graphic 1D), $p<0.001$ (95% IC 0.22 a 0.41).

Therefore, a statistically significant reduction in BMI score was found, Z score: 3.2 ± 0.67 , to 2.9 ± 0.58 ($p<0.001$), fasting glycaemia ($p=0.002$). There were no significant differences in outcomes between others variables (lipids and blood pressure).

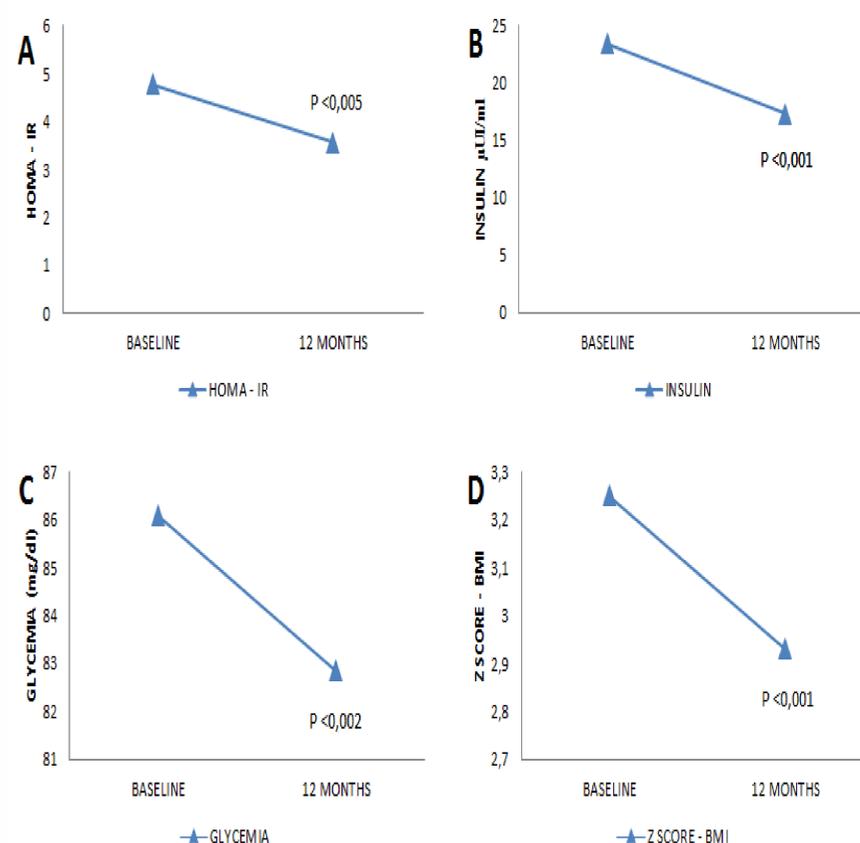


Figure 1. Glycemic status and body composition measures at baseline and after 12 months intervention. A: HOMA-IR index. 1Significance between baseline and 12 months as indicated. B: Insulin. 1Significance between baseline and 12 months. C: Fast Glycaemia. 1Significance between baseline and 12 months. D: BMI Z-score. 1Significance between baseline and 12 months.

CONCLUSION

Metformin increased insulin sensitivity and improved BMI, providing statistically significant results. This data suggests a clinical benefit on using metformin in children and adolescents.

