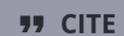




ARTICLE

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RESEARCH ARTICLE

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Estimated insulin sensitivity, cardiovascular risk, and hepatic
steatosis after 12 years from the onset of T1DArianna Petrelli¹ | Lucilla Ravà² | Alberto Mascali³ | Novella Rapini⁴ |
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Abstract

Aim: To test the hypothesis that intensive insulin treatment and optimal glycaemic control are not fully protective against reduction of insulin sensitivity in children with type 1 diabetes.**Material and methods:** Cohort study of 78 normal-weight patients with prepubertal onset (T_0) and follow-up waves at 1 (T_1), 5 (T_5), 10 (T_{10}), and 12 (T_{12}) years; matched for age and sex to 30 controls at T_{12} . Estimated insulin sensitivity (eIS) by three formulae; ultrasound evaluation of para and perirenal fat thickness; hepatic steatosis (HS); carotid intima media thickness (cIMT) at T_{12} .**Results:** At T_{12} , the 36 patients (46%) who had constantly or prevalently haemoglobin A1c (HbA1c) < 58 mmol/l during follow-up showed better eIS indexes ($p = 0.049$ to <0.0001); lipid profile ($p = 0.042$ to <0.0001), reduced fat mass ($p = 0.012$) and required lower insulin dose ($p = 0.032$) than the 42 patients (54%) with HbA1c ≥ 58 at T_{12} . Patients ($N = 25$) with $eIS_{EDC} < 8.77 \text{ mg kg}^{-1} \text{ min}^{-1}$ showed higher cIMT ($p < 0.0001$). HS was found in 6 patients (~8%). In patients and normal-weight controls, fat mass ($p = 0.03$), age ($p = 0.03$), cIMT ($p = 0.05$) predicted HS; eIS indexes (p from 0.04 to <0.0001) predicted cIMT. Body mass index, perirenal fat, fat mass, and triglycerides to high density lipoprotein cholesterol ratio were associated with eIS indexes (p from 0.03 to <0.0001).**Conclusions:** Young T1D patients have reduced insulin sensitivity and higher cIMT. Adiposity, glucose, and lipid control over follow-up are likely to influence both. Enhanced adiposity seems of paramount relevance for the onset of HS in T1D patients alike in healthy youths.**Abbreviations:** ALT, Alanine aminotransferases; AST, Aspartate aminotransferases; BMI, Body Mass Index; CACTI, Coronary Artery Calcification in Type 1 diabetes Study; CVD, Cardiovascular Disease; cIMT, Carotid Intima Media Thickness; DID, Daily insulin dose; eGDR, Estimated Glucose Disposal Rate; EDC, Pittsburgh Epidemiology of Diabetes Complications Study; EMRs, Electronic medical records; eIS, Estimated Insulin Sensitivity; HbA1c, Glycosylated haemoglobin; HDL, High density lipoprotein; HOMA-IR, Homeostasis Model Assessment of Insulin Resistance; HS, Hepatic Steatosis; HT, Hypertension; IIT, Intensive Insulin Treatment; IRS, Insulin Resistance Syndrome; ISS, Insulin Sensitivity Score; γ GT, γ -glutamyl-transferase; LDL, Low density lipoprotein; PWV, Pulse wave velocity; SEARCH, for Diabetes in Youth Study; SES, Socio-economic status; TC, Total cholesterol; T1D, Type 1 Diabetes; T2D, Type 2 Diabetes; TG, Triglycerides; WC, Waist Circumference; WHR, Waist to hip ratio.