Estimated insulin sensitivity, cardiovascular risk, and hepatic steatosis after 12 years from the onset of T1D

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Abstract

Aim: To test the hypothesis that intensive insulin treatment and optimal glycemic 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 prepertual onset (T1) and follow-up waves at 1 (T12), 10 (T10), and 12 (T12) years; matched for age and sex to 30 controls at T1. Estimated insulin sensitivity (eIS) by three formulae; ultrasound evaluation of para and perirenal fat thickness; hepatic steatosis (HS); carotid intima media thickness (cIMT) at T12.

Results: At T12, 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 T12. Patients (N = 25) with eIS < 8.77 mg/kg−1min−1 showed higher cIMT (p = 0.0001). HS was found in 6 patients (−8%). In patients with normal-weight controls, mass (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 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.