Assessment of impaired glucose tolerance and diabetes in an obese paediatric population

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Background & Aims

- Screening for prediabetes or type 2 diabetes (T2D) is recommended for obese children >10 yrs (or onset of puberty) in the presence of two or more of the following risk factors:
  - Family history of T2D in a 1st or 2nd relative,
  - High-risk ethnicity,
  - Signs of insulin resistance (IR) or associated conditions,
  - Maternal gestational diabetes.
- Diagnostic utility of HbA1C remains controversial in this population.

Aims

- To evaluate the prevalence of prediabetes and T2D among a cohort of obese children using oral glucose tolerance test (OGTT).
- To assess the utility of alternative tests: fasting plasma glucose (FPG), and HbA1C as compared to the OGTT.

Patients & Methods

- 148 obese children/adolescents recruited from an ambulatory pediatric endocrine service (BMI Z-Score ≥ 2.0 SDS per WHO 1).
- Evaluation at 08:00 a.m. following 8-hour, overnight fast.
- Baseline measurement of plasma glucose, insulin, lipids, HbA1C, and leptin levels followed by a standard OGTT.
- Patients with acute or chronic inflammatory process, known diabetes, medication that alters glucose/lipid metabolism were excluded.

Definitions

- Insulin resistance (IR): HOMA-IR ≥ 2.7 in the absence of prediabetes or T2D.
- Prediabetes: impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT) on standard OGTT:
  - IFG: FPG between 5.6 - 6.9 mM
  - IGT: T120-glucose 7.8 - 11.0 mM (OGTT)
  - T2D: FPG level ≥ 7.0 mM or a T120-glucose ≥ 11.1 mM

Results

![Diagram of OGTT results]

- Diagnosis according to OGTT results
- FPG vs. OGTT for diagnosing prediabetes & T2D

Discussion & Conclusions

- In total, 20% of this cohort of obese Swiss children had either prediabetes or T2D based on OGTT results.
- Remarkably, more than half would have been missed using fasting glucose measurement alone.
- HbA1C levels do not correlate well with OGTT results in children and adolescents.
- These data raise questions concerning the ADA identified limits for screening prediabetes and T2D in such at-risk pediatric patients.

References