Can Increased First Hour Glucose Concentration in OGTT Be a New Indicator in Projecting Metabolic Profile?

Nursel Muratoğlu Şahin¹, Ashan Arash Yilmaz¹, Servan Özalkak, Zehra Aycan²

1- Dr.Sami Ulus Maternity, Child Health and Diseases Training and Research Hospital, Pediatric Endocrinology Department
2- Ankara University Medicine Faculty, Pediatric Endocrinology Department

Introduction-Aim: Recent studies have shown that the first hour glucose concentration of ≥155 mg / dl in the oral glucose tolerance test (OGTT) in adults with normal glucose tolerance (NGT) may be a strong marker for the development of diabetes, and also an increase in subclinical inflammation, insulin resistance, dyslipidemia and serum transaminases. These results indicate that adults with NGT have increased risk of developing cardiovascular disease and non-alcoholic liver disease as well as type 2 diabetes. Research done on children is limited, and in our study, it was aimed to investigate the relationship between increased first hour glucose concentration during OGTT and metabolic parameters in children with NGT.

Methods:
The records of 193 obese / overweight children aged 9-18 years who underwent OGTT were retrospectively evaluated. NGT: Fasting plasma glucose was defined as <100 mg / dl, second hour blood glucose <140 mg / dl. 143 cases with NGT were included in the study. Group 1 with OGTT first hour glucose concentration ≥155 mg / dl, and group 2 with first hour glucose concentration ≥155 mg / dl. BMI, hypertension, lipid profile, insulin resistance, serum transaminases, uric acid level and hepatosteatosis were compared among the groups.

Results:
The mean age of our cases was 13.6 ± 2.2 years, 64.3% female and 35.7% male. 8.4% were Tanner stage 1, 49.7% were Tanner stage 5. When the gender distribution is examined: the rate of boys in group 2 (53.1%) was significantly higher than the rate of boys in group 1 (30.6%) (p = 0.019). Accordingly, the risk of OGTT first hour plasma glucose value ≥ 155 was significantly higher in boys in this age group. Group 1 and group 2 were similar when evaluated according to age, BMI, BMI-SD and puberty (p > 0.05) (Table-1). In group 2, systolic, diastolic blood pressure, serum triglyceride, uric acid, ALT, HbA1C and HOMA-IR levels were significantly higher whereas HDL level was significantly lower (p < 0.05/Table-2). In group 2, hepatosteatosis was detected in all cases except one patient; group 1 had a significantly lower rate of hepatosteatosis (p < 0.05). OGTT first hour glucose concentration was positively correlated with acanthosis nigricans, triglyceride, uric acid, ALT, hepatosteatosis, HbA1C and HOMA-IR while it was negatively correlated with HDL (p < 0.05).

When the risk factors affecting OGTT 1 hour plasma glucose value were evaluated by logistic regression analysis, male gender (3.904 [1.026 - 14.854]), p = 0.046), high fasting insulin level (0.028 [0.001 - 0.607], p = 0.023), any presence of hypertension (3.327 [1.418 - 7.808], p = 0.006), 0.259 [0.009 - 7.228], p = 0.426) and BMI (0.616 [0.339 - 353.833], p = 0.115) were found (Table-3).

Conclusions: Children with first hour postload plasma glucose concentration of ≥155 mg / dl, despite being defined as normal according to the ADA criteria, have a worse metabolic profile in terms of cardiovascular disease and the development of type 2 diabetes. OGTT first hour glucose concentration should be considered as a valuable marker in identifying risky children, even if they have NGT.

References: