Is the insulin secretion in pancreatic beta cells related with IGF-1/IGFBP-1 axis in Korean children?

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OBJECTIVES

Recent studies have revealed that type 2 diabetes, including impaired glucose tolerance are associated cross-sectionally with altered circulating level of IGF-I and its binding proteins (IGFBPs). The aim of this study was to investigate

1. Is there a difference of serum IGF-I and IGFBP-1 in subjects grouped by glucose tolerance state and BMI.

2. Are there significant correlations between serum IGF-I and IGFBP-1 and clinical variables in children.

METHODS

• Selection of subjects
  Evaluation of diabetes in the 36 subjects with glucosuria detected by school urinary screening test and obesity at Chonbuk National University Children Hospital
  • 2013. 3 – 2014. 8
  • Age: 10-18 years old
  • Diabetes mellitus (I), Chronic disease (renal disease, hypertension, metabolic disease, growth retardation, etc.) (I), Medication history (I)
  • By oral glucose tolerance test
  • Normal glucose tolerance (NGT), Impaired glucose tolerance (IGT)
  • Diabetes Mellitus (DM)
  • By body mass index (BMI)
  • Normal: BMI 15-85 percentile, Overweight: 85 ≤ BMI < 95 percentile
  • Obesity: BMI ≥ 95 percentile
  • Data from review medical records retrospectively
  • Demographic findings: Gender, Age, Body mass index (BMI, kg/m²)
  • Laboratory data
    IGF-I, IGFBP-3 (IRMA kit (ImmunoTech, Cobra, France)), IGFBP-1 (ELISA kit, Alnova, USA), HbA1c, serum fasting plasma glucose level (FPG)

RESULTS

• Table 1. Demographic features of 36 studied subjects

• Table 2. Correlation (r) between serum IGF-I and IGFBP-1 and clinical variables

CONCLUSIONS

• Serum IGF-I, IGFBP-3 and IGF-I/IGFBP-1 ratio levels were significantly higher in glucose intolerance group than NGT. Serum IGFBP-1 level showed the negative correlation with BMI, HOMA-IR, serum c-peptide, IGF-I and IGFBP-3 in studied subjects. In glucose intolerance group, serum IGF-I level was no significantly association, but IGFBP-1 was negative correlation with BMI and serum c-peptide. Serum IGF-I/IGFBP-1 ratio was significantly associated with HOMA-IR, serum c-peptide and IGFBP-3. According to BMI, serum IGF-I and IGFBP-1 levels were not significantly different within each group.

• These findings suggest that the alteration of serum IGF-I/IGFBP-1 axis in glucose intolerance state is due to disease itself rather than obesity, and IGF-I/IGFBP-1 ratio, especially IGFBP-1, are related to insulin secretion in pancreatic beta cell.

• Further studies investigating the relationship between IGFBP-1 and type 2 diabetes in children and adolescents will be needed.