

Abstract

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Magnesium deficiency is associated with insulin resistance in obese children.

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OBJECTIVE: Magnesium deficiency has been associated with insulin resistance (IR) and increased risk for type 2 diabetes in adults. This study was designed to determine whether obese children exhibit serum or dietary magnesium deficiency and its potential association with IR.

RESEARCH DESIGN AND METHODS: We studied 24 obese nondiabetic children (BMI > or =85th percentile) and 24 sex- and puberty-matched lean control subjects (BMI <85th percentile). We measured serum magnesium, indexes of insulin sensitivity, dietary magnesium intake (using a food frequency questionnaire), and body composition (by air displacement plethysmography).

RESULTS: Serum magnesium was significantly lower in obese children (0.748 +/- 0.015 mmol/l, means +/- SE) compared with lean children (0.801 +/- 0.012 mmol/l) (P = 0.009). Serum magnesium was inversely correlated with fasting insulin (r(s) = -0.36 [95% CI -0.59 to -0.08]; P = 0.011) and positively correlated with quantitative insulin sensitivity check index (QUICKI) (0.35 [0.06-0.58]; P = 0.015). Dietary magnesium intake was significantly lower in obese children (obese: 0.12 +/- 0.004 vs. lean: 0.14 +/- 0.004 mg/kcal; P = 0.003). Dietary magnesium intake was inversely associated with fasting insulin (-0.43 [-0.64 to -0.16]; P = 0.002) and directly correlated with QUICKI (0.43 [0.16-0.64]; P = 0.002).

CONCLUSIONS: The association between magnesium deficiency and IR is present during childhood. Serum magnesium deficiency in obese children may be secondary to decreased dietary magnesium intake. Magnesium supplementation or increased intake of magnesium-rich foods may be an important tool in the prevention of type 2 diabetes in obese children.

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