Evaluation of left ventricular mass and function, lipid profile, and insulin resistance in Egyptian children with growth hormone deficiency: A single-center prospective case-control study

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Abstract:

Background: Growth hormone deficiency (GHD) in adults is associated with a cluster of cardiovascular risk factors that may contribute to an increased mortality for cardiovascular disease. In children, relatively few studies have investigated the effect of GHD and replacement therapy on cardiac performance and metabolic abnormalities that may place them at a higher risk of cardiovascular disease (CVD) at an early age. Aim: This study was aimed to assess the left ventricular function, lipid profile, and degree of insulin resistance in Egyptian children with GHD before and after 1 year of GH replacement therapy. Settings and Design: Prospective case-control study, single-center study. Materials and Methods: Thirty children with short stature due to GHD were studied in comparison to 20 healthy age- and sex-matched children. All subjects were subjected to history, clinical examination, auxological assessment, and echocardiography to assess the left ventricular function. Blood samples were collected for measuring IGF-1, lipid profile (Total, LDL, HDL cholesterol, triglyceride, and atherogenic index (AI), fasting blood sugar, and fasting insulin levels. In addition, basal and stimulated GH levels were measured in children with suspected GHD. Statistical Analysis Used: Student's t-test was used for parametric data, and the Mann-Whitney U-test was used for non-parametric data. Results: Total, LDL cholesterol, triglyceride, AI, and insulin were significantly higher in children with GHD than in healthy controls at baseline. After 12 months of GH replacement therapy, total, LDL cholesterol, triglyceride, AI and insulin were significantly decreased, while homeostatic model assessment for insulin resistance index (HOMA-IR) was significantly increased compared to both pre-treatment and control values. At baseline, the left ventricular mass (LVM) and left ventricular mass index (LVMi) were significantly lower in GHD children than in controls. After 12 months of GH replacement therapy, LVM and LVMi in GHD patients were significantly increased compared to pre-treatment values. Conclusions: GHD in children is associated with a significantly reduced cardiac mass and impairment of lipid profile. GH replacement therapy exerts beneficial effects both on cardiac mass and lipid metabolism by normalizing cardiac size and improving the lipid profile. On the contrary, an increase in insulin resistance is observed after 12 months GH treatment. The study suggests that children with GH deficiency should have echocardiography and lipid profile monitoring before and during treatment with GH.

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