

Cardiac functions in children with growth hormone deficiency before and during growth hormone replacement therapy

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Objectives: Childhood growth hormone deficiency (GHD) has reduced left ventricular (LV) mass, but impairment of cardiac function has never been documented. The objective was to assess the cardiac effects of GHD and recombinant human growth hormone (rhGH) treatment using conventional echocardiography and tissue Doppler imaging.

Methods: In two pharmacological tests, the diagnosis of GHD was based on a peak level of growth hormone less than 10 microgram/liter. Complete two-dimensional, M-mode, pulse wave Doppler echocardiography and pulse wave tissue Doppler imaging were performed in 12 children (six males and six females) with GHD at baseline and 5.86 ± 1.61 month after rhGH therapy. Among nonparametric tests, Wilcoxon test was used to compare the clinical and cardiac variables before and after rhGH treatment.

Results: The rhGH treatment was associated with a significant increase of LV mass index (63.8 ± 27.1 to 79.3 ± 30.3 g/m²; $p < 0.01$) and LV internal dimensions (21.4 ± 2.63 to 24.0 ± 4.13 mm in systole; $p = 0.03$ and 36.5 ± 3.90 to 39.5 ± 4.94 mm in diastole; $p < 0.01$). There were statistically difference regarding parameters such as deceleration time of early peak velocity of mitral, isovolumic relaxation time, and myocardial performance index (103 ± 15.4 to 139 ± 21.2 ms; $p < 0.01$, 55.5 ± 9.24 to 44.9 ± 5.44 ms; $p < 0.01$, and 37.8 ± 4.46 to $69.2 \pm 3.74\%$; $p < 0.01$, respectively). Before and during rhGH therapy, there were no significant differences regarding fractional shortening of the left ventricle, peak mitral and tricuspid wave velocities with ratios using conventional echocardiography and tissue Doppler imaging.

Conclusions: In children, GHD affects heart morphology, by inducing a decrease in cardiac size, but does not modify cardiac function. The rhGH treatment increases cardiac mass, but does not difference parameters of conventional echocardiography and tissue Doppler imaging. It should be mentioned, however, that our series is small and the treatment period is short; other data are thus helpful in confirming the cardiac effects of rhGH therapy in children with GHD.