Bone Health and Body Composition in Childhood Onset Growth Hormone Deficiency at the Time of Initial Evaluation and Retesting

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Background

Childhood onset growth hormone deficiency (CO-GHD) may contribute to low bone mass and alterations in body composition. However, the direct mechanisms by which CO-GHD effects bone health are not yet clearly defined.

Objectives

To evaluate musculoskeletal health in CO-GHD subjects at the time of initial evaluation and retesting after final height.

Population and Method

A cross-sectional study of assessing bone health and body composition by imaging (DXA and pQCT), muscle strength by mechanography, and biochemical assessment in children undergoing GH stimulation tests for short stature and biochemical revaluation at final height after GH therapy.

Results

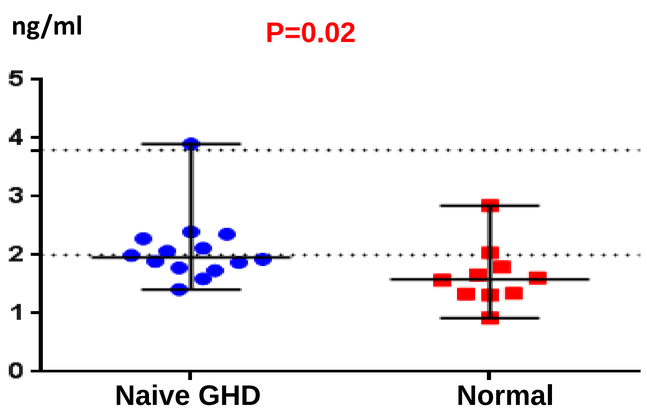
Table 1 Auxological and clinical characteristics of first time assessment groups and retesting groups

	First time assessment (n=15)		Retesting (n=11)	
	Naive GHD (n=15)	Normal (n=10)	Persistent GHD (n=7)	GH sufficient (n=4)
M/F	13/2	7/3	3/4	1/3
Age(yrs)	10.9 (5.6, 15.2)	12.1 (5.8, 16.5)	16.6 (14.9, 18.6)	16.8(16.3, 20.4)
Height -SDS	-2.5 (-3.4, 1.3)	-2.2 (-4.6, -0.1)	-1.2 (-1.9, 1.2)	-1.6(-3.0, 0.5)
Weight-SDS	-1.8 (-3.6, 1.9)	-1.3 (-4.7, 0.7)	0.6 (-1.8, 1.4)	0.0(-3.2- 1.1)
BMI-SDS	0.0(-1.8- 3.0)	0.0 (-2.4, 1.6)	0.9 (-1.1, 2.0)	1.0(-1.4- 1.1)
GH-peak(µg/l)	2.6 (0.7, 4.7)	8.0(6.7, 22.3)*	2.0 (0.1, 3.8)	8.3(6.4, 10.2)
IGF1 levels(ng/ml)	65.0 (14.0, 433.0)	85.5(28.0, 295.0)	141.0 (18.0, 294.0)	241.5(117, 327.0)
IGF1 levels SDS	-3.2 (<-5.0, 0.3)	-2.0 (-4.5, -0.9)	-3.2 (<-5.0, -1.3)	-2.0 (-3.5, -0.9)
Retesting data				
Age of childhood diagnosis (yr)			9.5 (2.6, 10.3)	11.4(7.0, 12.0)
Age of start treatment(yr)			10.3 (7.1, 13.6)	11.4(7.0, 12.0)
Duration of childhood rhGH (yr)			4.7 (2.9, 7.8)	8.0 (4.3, 10.2)
Age of stopping rhGH (yr)			15.9 (14.4, 17.9)	17.0(15.7, 20.0)
Duration of stopping rhGH (yr)			0.6(0.2, 1.0)	0.7(0.4, 1.0)

Bone and body composition

GH deficient did not differ in bone and body composition parameters (as measured by DXA and pQCT) from those who had normal GH levels at time of initial evaluation and retesting after final height.CO-GHD.

Figure-1:Bone resorption marker (CTX) was significantly higher in those with naive GHD compared to normal

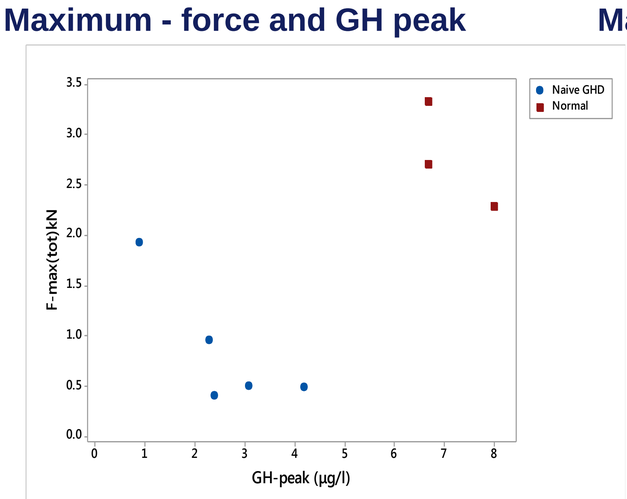


Results ctd

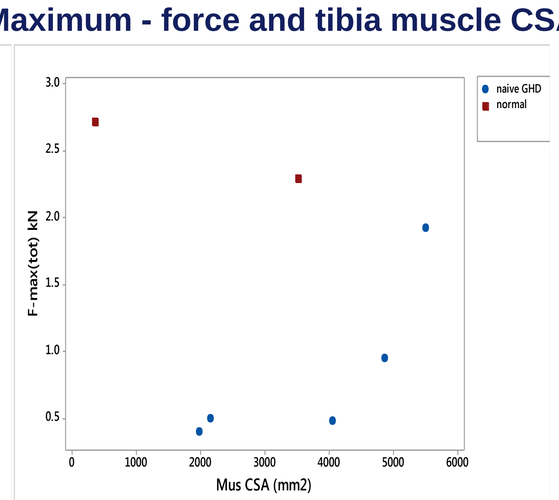
The median of maximum - force (F-max (kN) in naive GHD patients was significantly lower than those who had normal GH levels [0.5 (0.3, 2.8) vs 2.7 (2.2, 3.3) respectively, p= 0.03].

Figure 2, Scatterplot of muscle strength data

Maximum - force and GH peak



Maximum - force and tibia muscle CSA



Maximum-power (kN) with tibia muscle CSA

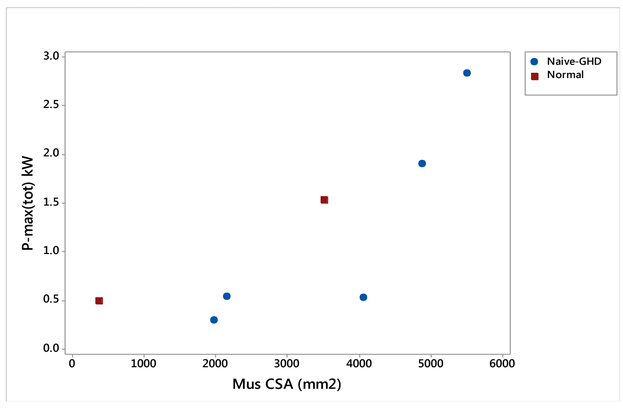
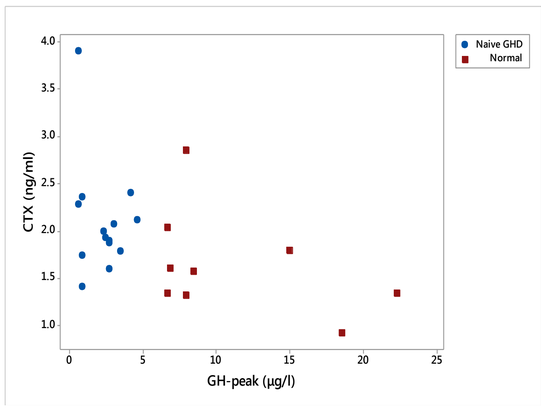
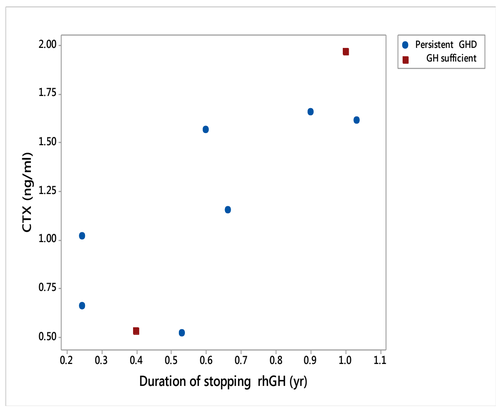


Figure 3, Correlation between bone parameters with biochemical data

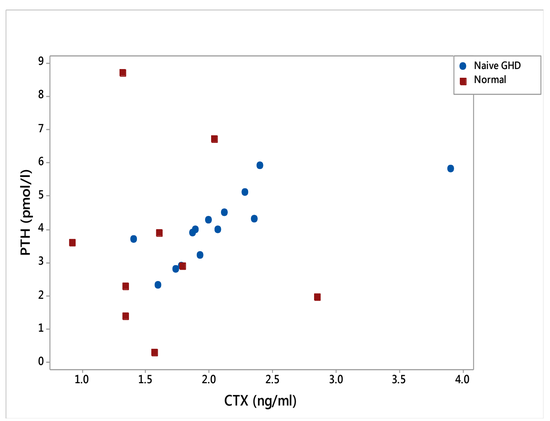
GH peak levels and CTX levels in the first time assessment



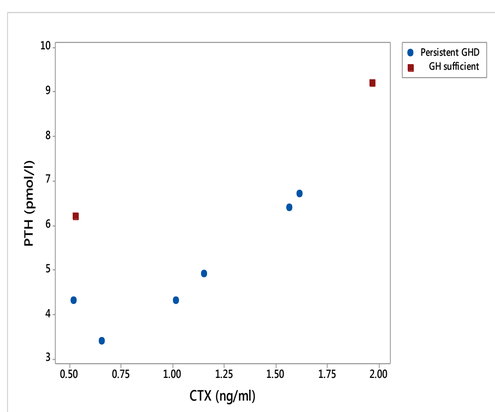
CTX levels and duration of stopping rhGH in retesting



PTH levels and CTX levels in the first time assessment



PTH levels and CTX levels in the retesting



Conclusion

Our results suggest that muscle strength and serum PTH may be an important determinant of bone loss in subjects with CO-GHD.

Disclosure Statements: The authors have nothing to disclose

55ESPE 112--P1

Bone & Mineral Metabolism

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DOI: 10.3252/pso.eu.55ESPE.2016

Poster presented at: ESPE 2016 PARIS

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