Body Mass Index is a Negative Predictor of Peak Stimulated Growth Hormone in Han Children with Short Stature

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OBJECTIVES

To assess the effects of body mass index (BMI) on peak growth hormone (GH) values in Han children with short stature.

METHODS

This was a retrospective, cross-sectional study. We used arginine-clonidine test to analyze the GH –insulin-like growth factor 1 (IGF1) axis in 657 Han children aged 2 to 16 years with short stature.

	All patients (657)	BMI SDS category				
		≤-1 (135)	-1 to 0 (297)	0 to 1 (149)	1 to 2 (55)	>2 (21)
Peak GH(ng/ml)	11.1±6.1	12.8±7.2	11.9±5.7	10.2±5.4	7.7±4.3	5.5±3.5
Gender(M/F)	407/250	67/68	179/118	94/55	48/7	19/2
Pubertal status	518/139	130/5	263/34	87/22	28/27	10/11
IGF1(ng/ml)	140.5±83.3	80.8±45.4	128.2±70.4	180.7±73.5	206.5±95.1	240.9±121.9
BMI SDS	-0.2±1	-1.3±0.2	-0.5±0.3	0.5±0.3	1.4±0.3	2.7±0.7
Insulin(Mu/L)	2.5±3.2	1.4±2.3	2.3±3.1	3.1±3.6	3.4±3.8	4.7±4.5
C-peptide(nmol/L)	0.4±0.2	0.3±0.1	0.4±0.1	0.4±0.2	0.5±0.2	0.6±0.2
BG(mmol/L)	4.8±0.6	4.7±0.7	4.8±0.5	4.8±0.5	5.0±0.7	5.0±0.6
TSH(Uiu/L)	3±1.5	2.9±1.5	3.1±1.4	3±1.5	3.2±2.1	2.6±1
FT4(pmol/L)	18±2.7	19±3	18.1±2.6	17.4±2.3	16.9±2.6	16.6±2
FT3(pmol/L)	6.3±1	6.4±1.2	6.3±1	6.2±0.9	6.3±1.3	6.4±0.7
TC(mmol/L)	4.1±0.8	4.1±0.7	4.1±0.8	4.2±0.8	4.2±0.7	4.4±0.7
HDL(mmol/L)	1.5±0.3	1.5±0.3	1.5±0.3	1.5±0.3	1.4±0.3	1.4±0.3
TG(mmol/L)	0.7±0.4	0.7±0.2	0.7±0.3	0.8±0.4	0.9±0.7	1.1±0.6
Age(years)	8.9±2.9	6.2±2.4	8.3±2.4	11±1.7	11.4±2	11.8±1.6
Bone age(years)	6.8±3	4.1±2.3	6.2±2.5	9±2	9.4±2.2	10±2.3
Ht SDS	-2.4±0.9	-2.6±1	-2.4±0.8	-2.2±0.7	-2.1±1.4	-1.9±1.0

parameter	B	Standard coefficient	P	R^2
BMI SDS	-0.210	-0.298	0.000	0.08
TC	-0.099	-0.108	0.004	0.017

Fig 1. Scatterplot for the peak GH value according to BMI SDS
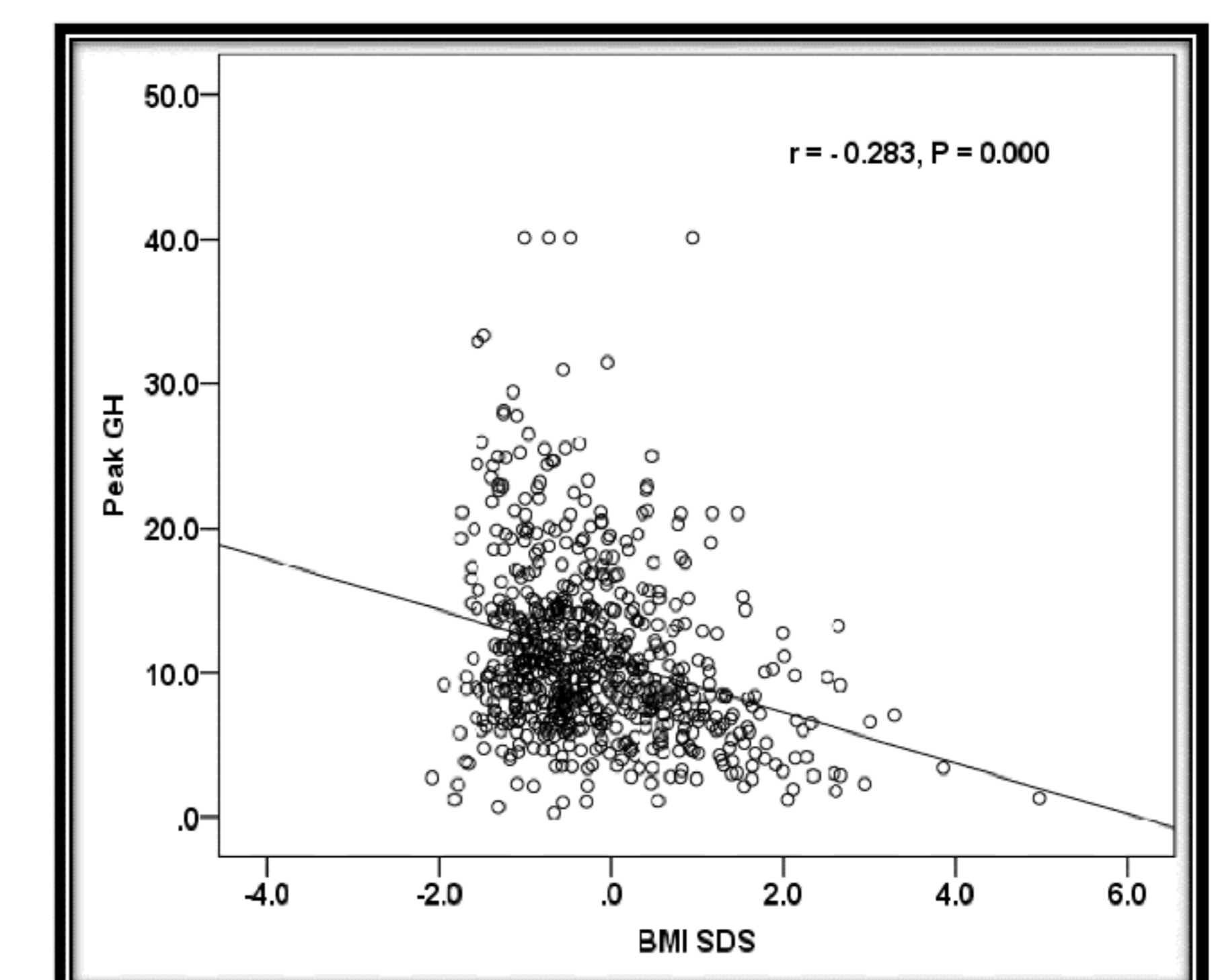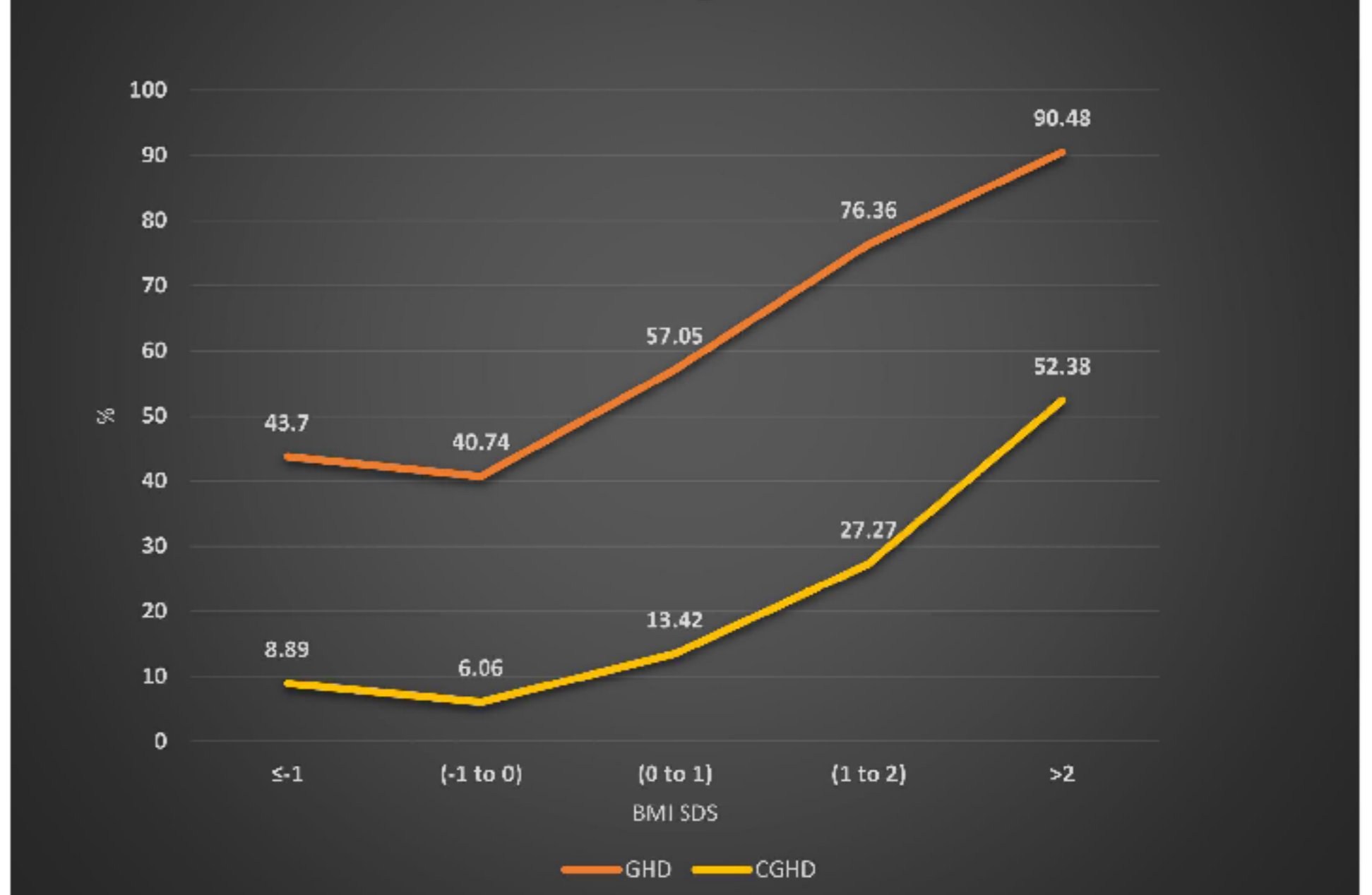
r = -0.283, P = 0.000

Fig. 2 Incidences of GHD and CGHD according to BMI SDS categories

RESULTS

BMI standard deviation score (SDS) and total cholesterol (TC) were the only significant and negative predictors of peak GH (stepwise multiple regression; P=0.000; P=0.004). Increased BMI SDS was associated with increased incidences of GHD and CGHD (Chi-square; P=0.000; P=0.000), the incidence of CGHD increased sharply with a BMI SDS >2.

CONCLUSIONS

Our data confirm that BMI has a negative impact on the peak GH response to arginine-clonidine testing, the affect is particularly strong in obese children.

References

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