

Total Sum of Growth Hormone Values obtained from Growth Hormone Stimulation Test may be useful in the Diagnosis of Prepubertal Children with Idiopathic Growth Hormone Deficiency.

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Background & Objective

The peak Growth hormone (GH) value plays a crucial role in the diagnosis of idiopathic growth hormone deficiency (iGHD). However, the prediction of peak GH in iGHD diagnosis is known to be limited. The purpose of this study was to evaluate the clinical and diagnostic usefulness of the total sum of GH values obtained from the GH stimulation test.

Material & Methods: We retrospectively reviewed 178 prepubertal children who were diagnosed with iGHD in the department of Pediatric Endocrinology at Kyungpook National University Children's Hospital for the past 5 years. Of these, 108 were boys and 70 were girls. The iGHD diagnosis was classified as 'complete iGHD' for peak GH <5 ng / mL and 'partial iGHD' for 5 ≤ peak GH <10 ng / mL in the L-dopa and insulin stimulation test (ITT). To investigate the clinical significance of 'sum of GH' during GH stimulation test, peak GH value, sIGF-I at the time of diagnosis, delayed bone age (CA-BA), anthropometric data were retrospectively analyzed.

Characteristic	Boy	Girl	P-Value*
Number	108	70	
CA(yr)	6.55±1.94	6.16±1.27	0.118
BA(yr)	3.72±2.09	4.02±1.60	0.297
CA-BA(yr)	2.84±1.02	2.13±0.88	0.000
BMI(kg/m ²)	15.99±1.65	15.81±1.73	0.395
BMI SDS	0.17±1.00	-0.01±1.14	0.255
Wt (kg)	19.01±4.22	17.50±3.20	0.013
Wt.SDS	-1.26±0.79	-1.44±0.85	0.147
Ht (cm)	108.56±10.1	104.98±7.70	0.001
Ht SDS	-1.96±0.41	-2.14±0.50	0.009
IGF-I(ng/ml)	122.27±42.8	144.84±56.67	0.001
IGF-I SDS	-0.90 ±0.68	0.03±0.90	0.000
Peak GH(L-dopa) (ng/ml)	4.41±2.77	4.61±2.34	0.624
Sum of GH (L-dopa) (ng/ml)	7.86±5.12	8.59±4.75	0.342
Peak GH (ITT) (ng/ml)	4.94±2.33	5.56±2.35	0.089
Sum of GH (ITT) (ng/ml)	14.52±7.13	16.47±7.37	0.080

Table 1. Clinical and laboratory characteristics study groups. CA=Chronological age, BA=Bone age, ITT : insulin tolerance test, L-dopa : L - Dopamine provocation test, GH : Growth hormone *P-value for Boy vs Girl

Results

The peak GH value and the sum of GH values in the GH stimulation test were highly correlated in both L-dopa and ITT ($r=0.881$ ($p<0.01$), $r=0.910$ ($p<0.01$)). The sum of GH in ITT was significantly correlated with sIGF-I in boys ($p = 0.034$). However, peak GH in ITT did not show a significant correlation with sIGF-I. In ITT, the sum of GH values showed significantly inverse correlation with CA-BA (yr) in the partial iGHD group ($r = -0.279$, $p = 0.031$). However, peak GH in ITT did not show a significant correlation with CA-BA. This suggests that the sum of GH values in ITT seems to be significantly associated with bone maturation.

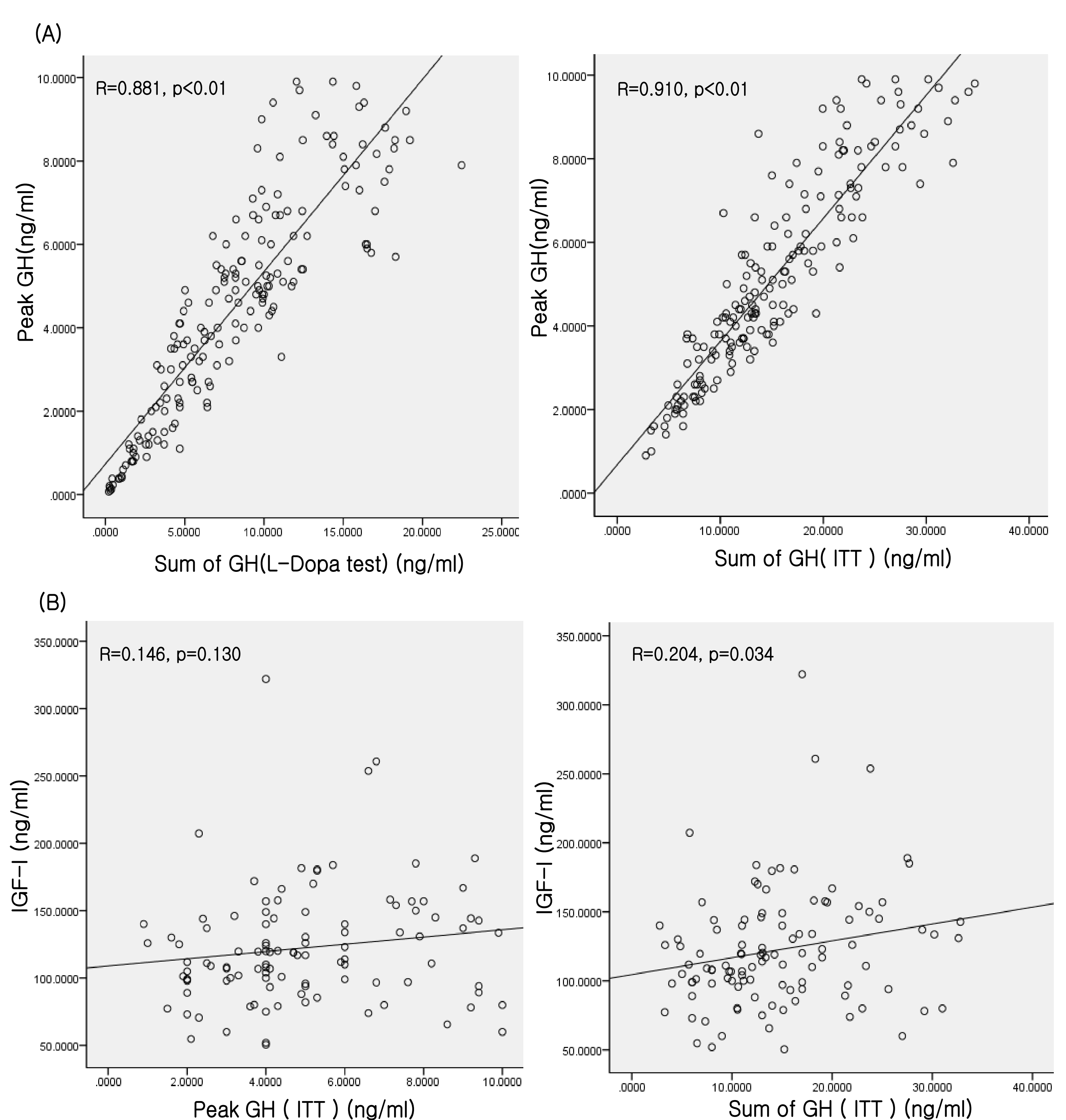


Fig 1. (A) Pearson correlation analysis demonstrated that it is correlated between peak GH and sum of GH in both GH provocation test (Total, n=178). (B) Pearson correlation analysis demonstrated that it is correlated between sum of GH in ITT and sIGF-I in boys (Boy, n=108)

Parameter	Δ CA -BA							
	Boy (n=108)				Girl (n=70)			
	Complete (n=48)		Partial (n=60)		Complete (n=25)		Partial (n=45)	
r	P-value	r	P-value	r	P-value	r	P-value	
Peak GH (ng/ml)	0.156	0.125	-0.206	0.114	0.006	0.977	0.071	0.643
Sum of GH (ng/ml)	0.179	0.099	-0.279	0.031*	0.125	0.551	0.128	0.402

Table 2. Pearson correlation coefficients between bone-age delay and GH levels of insulin tolerance test in Boys and Girls. Complete: peak GH concentration <5ug/L, Partial: peak GH concentration 5ug/L < *<10ug/L

Conclusions

Total sum of growth hormone values obtained from growth hormone stimulation test may be useful in the diagnosis of prepubertal children with iGHD. Additional large-scale studies are needed.