Intima media thickness in children with growth hormone

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Background

The cardiovascular risk for children receiving treatment with growth hormone (GH) has hardly been investigated. Therefore, we studied the relationships between GH treatment and carotid intima media thickness as marker for the cardiovascular diseases.

Methods

We measured carotid IMT (cIMT) in 99 children treated with GH and 99 age- and gender-matched healthy children without GH treatment. Furthermore, we analyzed blood pressure, lipids, HbA1c, IGF-1, and IGFBP-3 in children treated with GH. The mean duration of GH treatment was 4.4+/-2.2 years.

Results

The mean and maximum cIMT levels did not differ significantly between children with and without GH treatment (max cIMT in median 0.50 mm versus 0.50 mm, mean cIMT in median 0.43 versus 0.45 mm). There were no significant differences in the maximal cIMT nor in the mean cIMT between the different GH indication groups. In backwards linear regression analyses, mean cIMT was significantly related to HbA1c, but not to age, gender, BMI, duration or doses of GH treatment, indication of GH treatment, IGF-1, IGFBP-3 nor to any cardiovascular risk factor. Furthermore, maximal cIMT was not related to age, gender, BMI, duration or doses of GH treatment, indication of GH treatment IGF-1 levels, or to any cardiovascular risk factor.

Conclusion

We found no evidence that GH treatment is associated with changes in the cardiovascular system measurable by cIMT.

Table 1:Clinical & anthropometric characteristics

	Supra-physiological GH doses	Healthy controls without GH treatment	p-value	physiological GH doses	Health controls without GH treatment	p-value
number	38	38	-	61	61	-
Age [years]	10.9 ±2.2	10.9 ±2.3	0.890	12.0 ±3.1	11.8 ±3.7	0.745
Gender	47% male	47% male	0.999 [1]	64% male	64% male	0.999 [1]
Height [cm]	137.5 ±11.5	145.4 ±15.1	0.015	142.9 ±17.6	154.0 ±16.9	<0.001
Weight [kg]	32.9 ±8.1	40.2 ±12.5	0.005	38.7 ±14.6	46.1 ±14.4	0.007
BMI [kg/m²]	17.2 ±2.3	18.1 ±2.6	0.110	18.2 ±3.3	18.9 ±2.8	0.202
BMI-SDS	-0.33 ±1.06	0.15 ±1.10	0.056	-0.20 ±1.03	0.11 ±1.20	0.167
Pubertal stage	47% prepubertal 52% pubertal	Not determined	-	48% prepubertal 52% pubertal	Not determined	-
Systolic blood pressure [mmHg]	109 ±12	Not determined	-	114 ±12	Not determined	-
Diastolic blood pressure [mmHg]	64 ±9	Not determined	-	63 ±8	Not determined	-
HbA1c (%)	5.3 ±0.2	Not determined	-	5.4 ±0.3	Not determined	-
Total cholesterol [mg/dl]	159 ±21	Not determined	-	161 ±26	Not determined	-
LDL cholesterol [mg/dl]	80 ±20	Not determined	-	82 ±24	Not determined	-
HDL cholesterol [mg/dl]	59 ±10	Not determined	-	59 ±12	Not determined	-

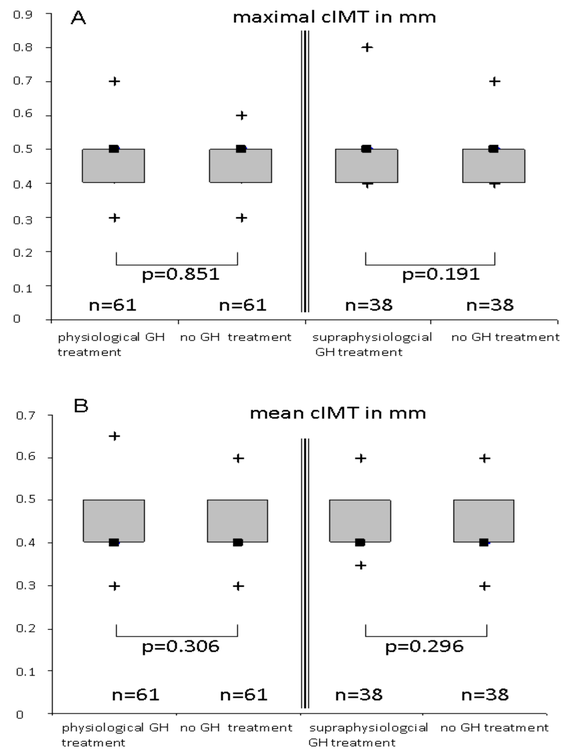

Figure 1: Box plots of cIMT levels in 38 children treated with supra-physiological GH doses and 38 age- and gender- matched healthy children without GH as well as box plots of cIMT in 61 children treated with physiological GH doses and 61 age- and gender- matched healthy children without GH (A: maximal cIMT, B: mean cIMT, GH: growth hormone; unadjusted p-values derived by Mann Whintey U test, p-values adjusted for BMI-SDS: supraphysiological GH doses: mean cIMT: p=0.246, max cIMT p=0.184; physiological GH doses: mean cIMT: p=0.789, max cIMT p=0.689).

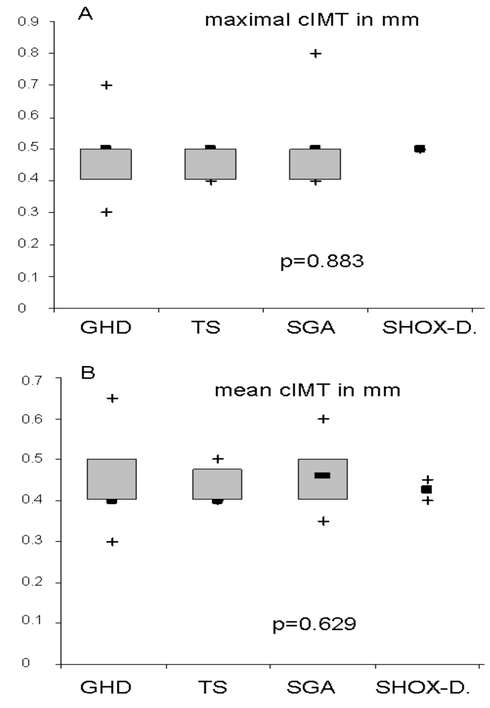

Figure 2: Box plots of carotid IMT measurements (A: maximal cIMT, B: mean cIMT) in 99 children treated with GH separated to indications of GH treatment (GHD: growth hormone deficiency, TS: Turner Syndrome, SGA: Small for Gestational Age, SHOX-D: *SHOX* deficiency)

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