

GH Therapy in Turner Syndrome Patients: the Effects on Nutritional Status, Adipokines, and Aortic Dilatation

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Background

- Recombinant human growth hormone (GH) therapy is an important part of management in Turner syndrome (TS). Thanks to GH treatment TS patients avoid negative consequences of short stature. Beneficial effect of GH therapy on height velocity in TS is confirmed. Data suggest also other advantages: increase in muscle mass, reduction of body fat mass and improvement of bone mineral density.
- On the other hand TS patients are at increased risk of different health problems: obesity, metabolic disturbances and cardiovascular complications. Body composition in TS is distinctly altered. The percentage of body fat mass (BFM) is higher. Also adipokine dysregulation is observed. TS is associated with aortic dilatation, which is seen not only in patients with congenital aortic defects but also in patients without underlying pathology.
- Considering different co-morbidities common in TS, it's extremely important to evaluate wide spectrum of growth hormone (GH) effects in these patients. Till now there are very few studies analyzing long-term effects of GH therapy on obesity and aortopathy in TS.

Objective

Assessment of long-term GH therapy effects on nutritional status and aortic dilatation in TS.

Population

53 TS patients with confirmed diagnosis.

Group 1: n=37, after GH therapy.

Mean GH dose: 0,43 mg/kg/week.

Group 2: n=16, never treated with GH because of late diagnosis of TS.

Exclusion criteria: diabetes mellitus, unbalanced thyroid pathology, aortic defects: aortic coarctation and bicuspid aortic valve.

	Group 1 (GH+) n=37	Group 2 (GH-) n=16
Karyotype	45,X	n=15 (40,54%)
	Mosaic	n=16 (43,24%)
	Structural abnormalities of X	n=10 (62,5%)
Age (yrs) mean (SD)	20,87 (3,69)	23,16 (5,8)
Age (yrs) min-max	15,3 - 32,0	15,8 - 32,8
Age at start of GH therapy (yrs)	11,73 ± 2,76	-
Treatment duration (yrs)	4,83 ± 2,65	-
Interval between GH discontinuation and study (yrs)	4,46 ± 3,11	-
Age at induction of puberty/spontaneous puberty (yrs)	14,18 ± 1,65	13,97 ± 2,06

Method

- Anthropometric measurements: height, weight, BMI, WHR
- Bioelectrical impedance analysis
- Laboratory tests: thyroid hormones, OGTT, adiponectin, obestatin, omentin, wisfatin
- Echocardiography, including different aortic diameters, which were indexed to BSA

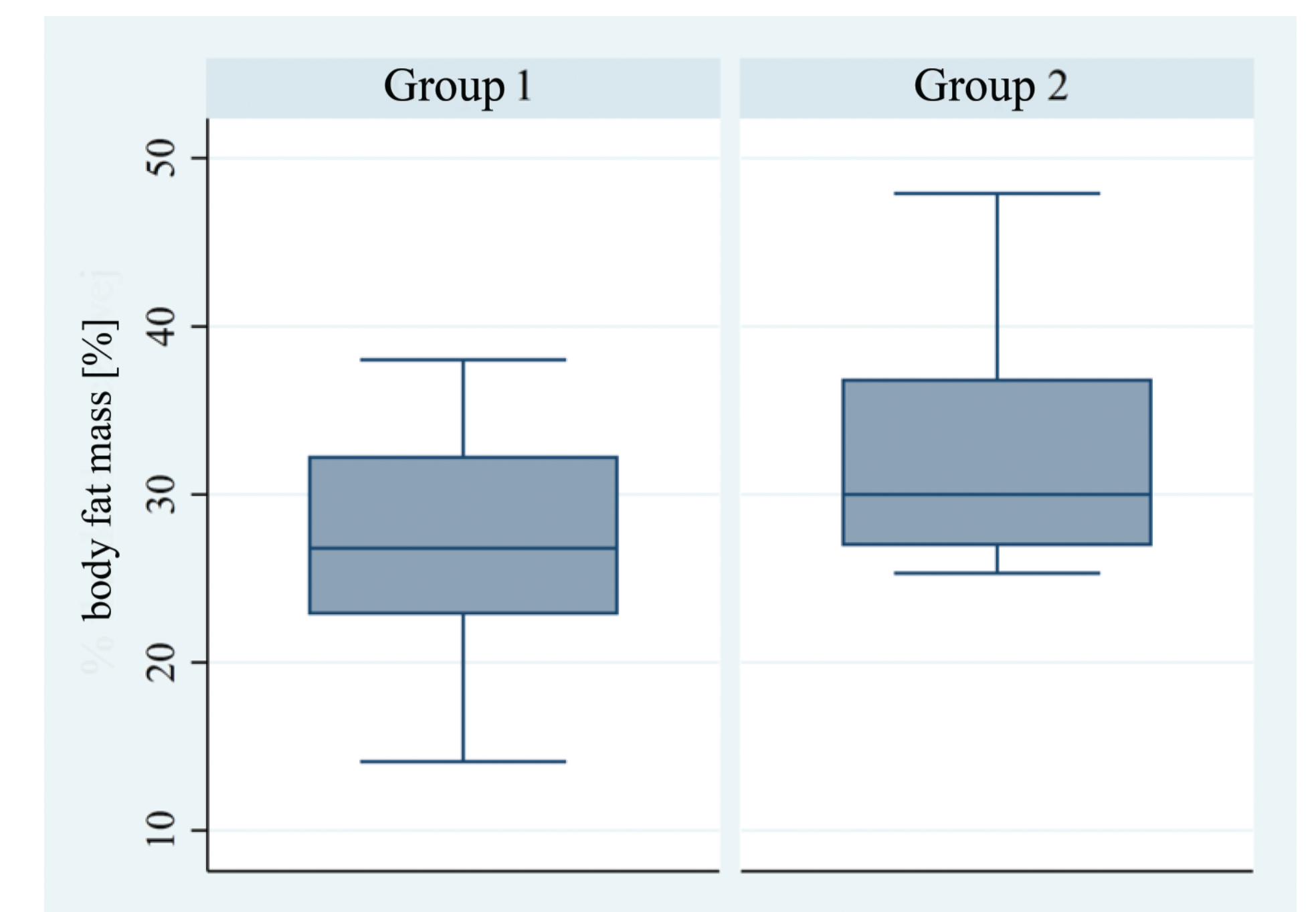
Results

Anthropometric parameters

	Group 1	Group 2	p
BMI [kg/m ²]	23,62 ± 3,78	24,65 ± 5,07	0,85
WHR	0,82 ± 0,07	0,87 ± 0,04	0,139
Body fat mas [%]	27,46 ± 5,66	31,8 ± 6,22	0,033

BMI, WHR didn't differ between groups.
BFM was significantly lower in group 1 vs 2

Impact of GH on body composition



Adipokines

	Group 1	Group 2	p
Adiponektin [µg/ml]	3,95 ± 0,4	3,81 ± 0,32	0,795
Omentin [ng/ml]	547,13 ± 252,02	707,12 ± 672,18	0,963
Wisfatin [ng/ml]	27,27 ± 3,83	25,73 ± 3,23	0,623
Obestatin [pg/ml]	252,26 ± 66,5	232,08 ± 39,55	0,756

There wasn't significant difference in adipokines between groups.

Aortic diameters

	Group 1	Group 2	p
Aortic root [cm]	2,65 ± 0,35	2,56 ± 0,33	0,467
Ascending aorta [cm]	2,28 ± 0,38	2,28 ± 0,37	0,975
Aortic root/BSA [cm/m ²]	1,71 ± 0,27	1,76 ± 0,28	0,611
Ascending aorta/BSA (ASI) [cm/m ²]	1,48 ± 0,25	1,57 ± 0,23	0,276

Aortic diameters didn't differ between groups.

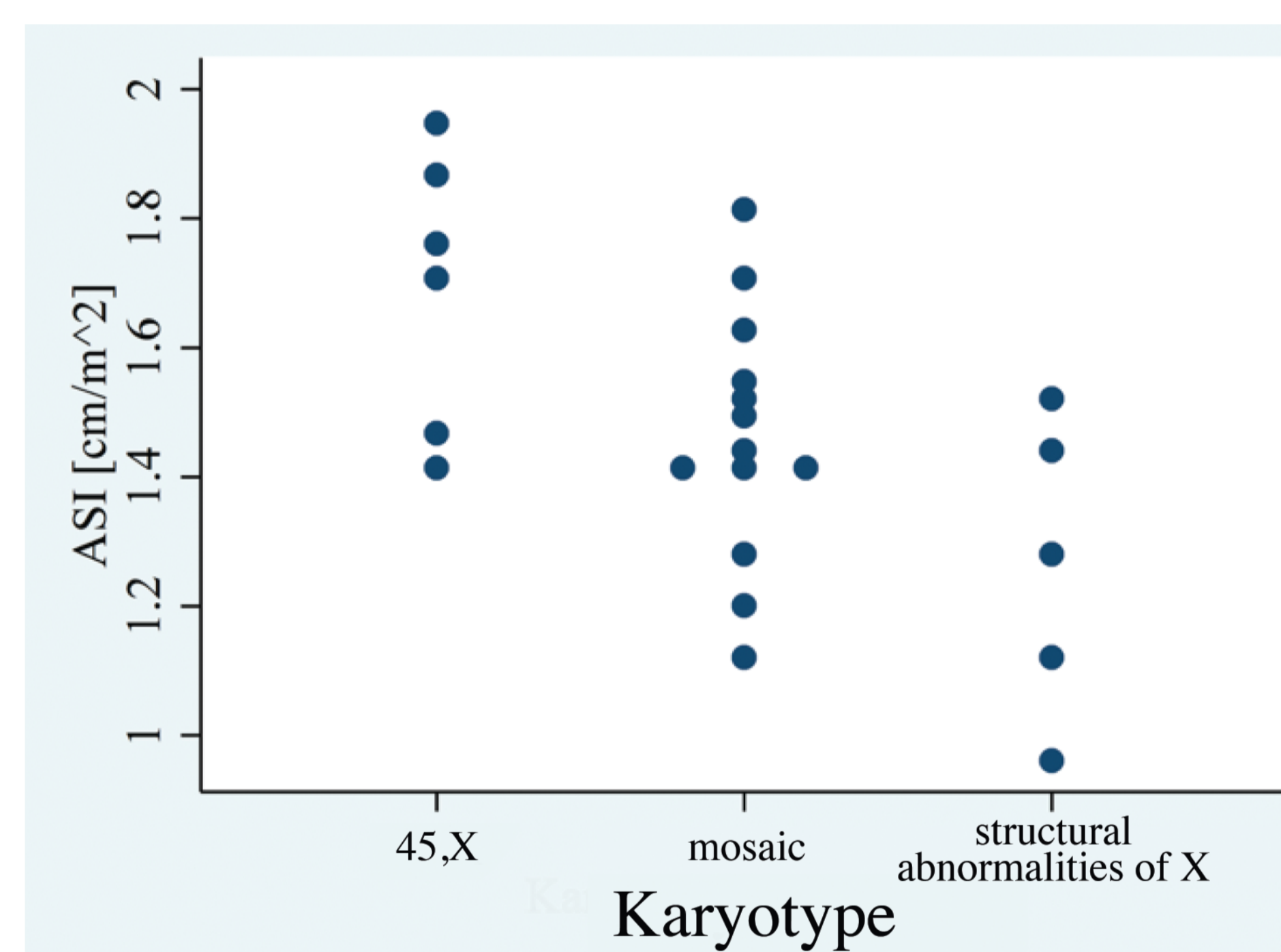
Correlation of the aortic diameters

	Age	Treatment duration	Body fat mass [%]	WHR	Obestatin	Karyotype
Aortic root/BSA	0,6172	-0,3653	-0,0822	-0,0667	-0,2689	-0,2249
Spearman's rank correlation coeff.(p)	(0,001)	(0,0725)	(0,6961)	(0,7682)	(0,2262)	(0,2797)
ASI	0,1500	-0,1383	-0,1770	-0,1845	-0,6117	-0,4886
Spearman's rank correlation coeff.(p)	(0,4462)	(0,4827)	(0,3771)	(0,3882)	(0,0015)	(0,0083)

Correlation between aortic diameters, age, karyotype and obestatin concentration was observed.

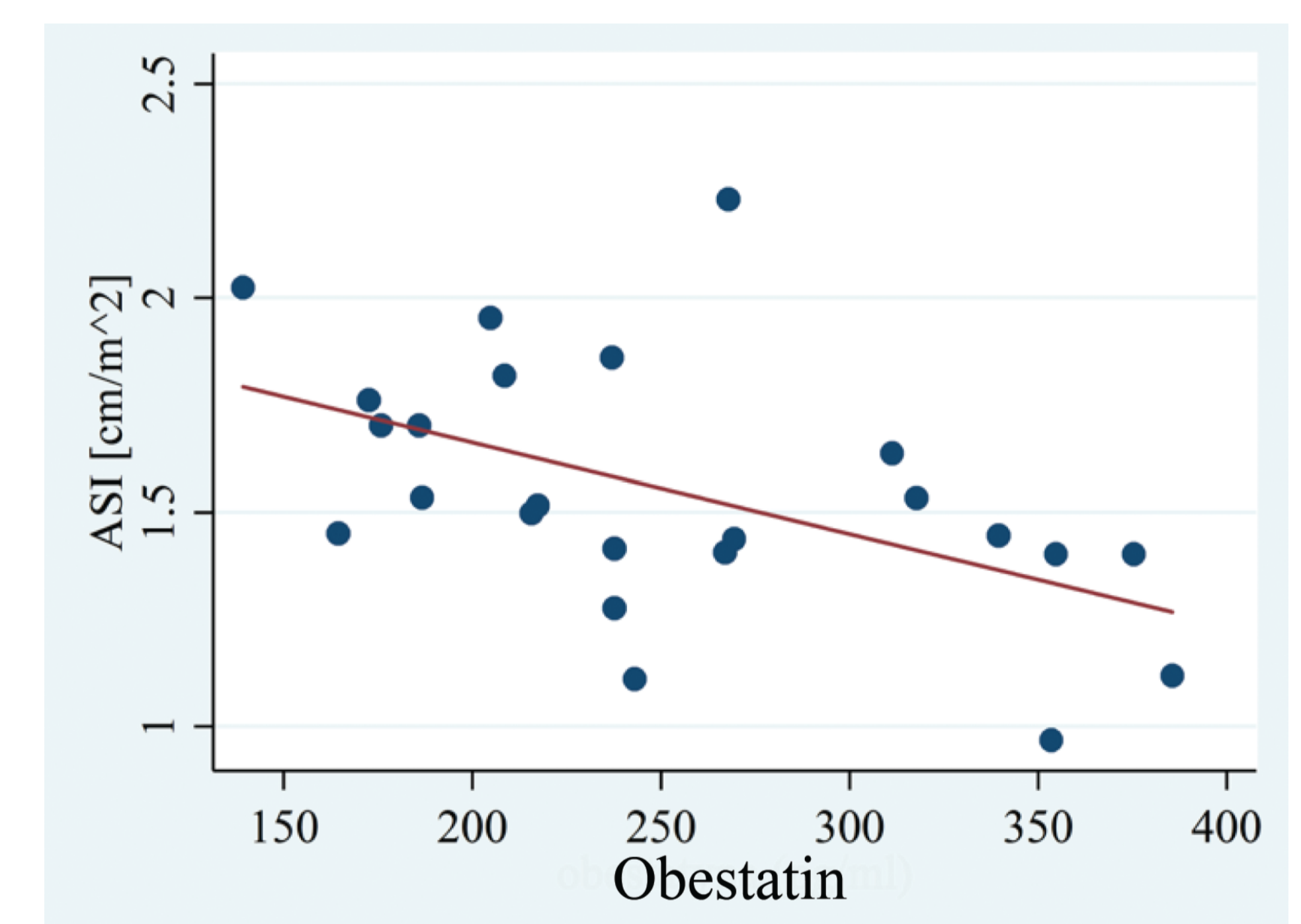
There was no correlation between aortic diameters and GH treatment duration.

Correlation between ASI and karyotype



ASI correlated with karyotype.

Correlation between ASI and Obestatin



Negative correlation between aortic size index (ASI) and obestatin was noted.

Conclusions

- GH therapy in TS has beneficial impact on body composition.
- GH therapy has no direct effect on aortic dimension.
- The association between obestatin, which negatively correlates with nutritional status, and aortic size, suggests that GH treatment may decrease aortic dilatation risk in TS.