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Increasing Lean Body Mass (LBM), Phase Angle (PA), and Total Body Water (TBW) but decreasing Body Fat (BF) among short-statured children born Small-for-Gestational Age on Growth Hormone Treatment

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Background:

There is a small proportion of children born SGA without postnatal catch-up growth who are presented with persistent short stature, low BMI, and decreased lean body mass. Data on body composition are rarely reported in the literature. Our study addresses the question whether human recombinant GH treatment could affect body composition in these SGA children or not.

Design:

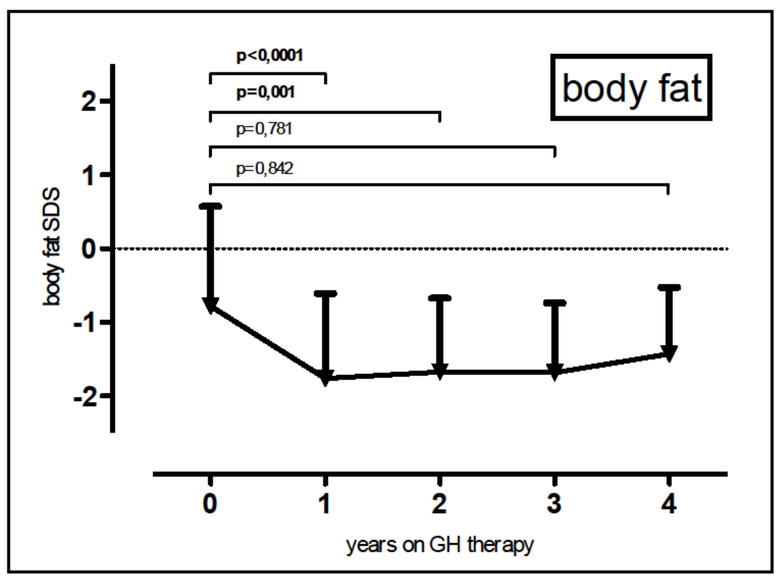
We included 58 SGA children (n= 20 females) with SGA (birth weight and/or birth length <-2.0 SDS). At start of GH treatment, chronol. ages varied between 3.5 and 12 years (median 9 yrs.). GH was administered daily s.c. in a mean GH dose of 35 µg/kg BW). Body composition was measured by single-frequency bioelectrical impedance analysis (BIA) at start of GH, and thereafter annually for 4 years. LBM, PA, TBW, and BF values were converted into SDS. Additionally, IGF-1 and IGFBP3 levels were obtained.

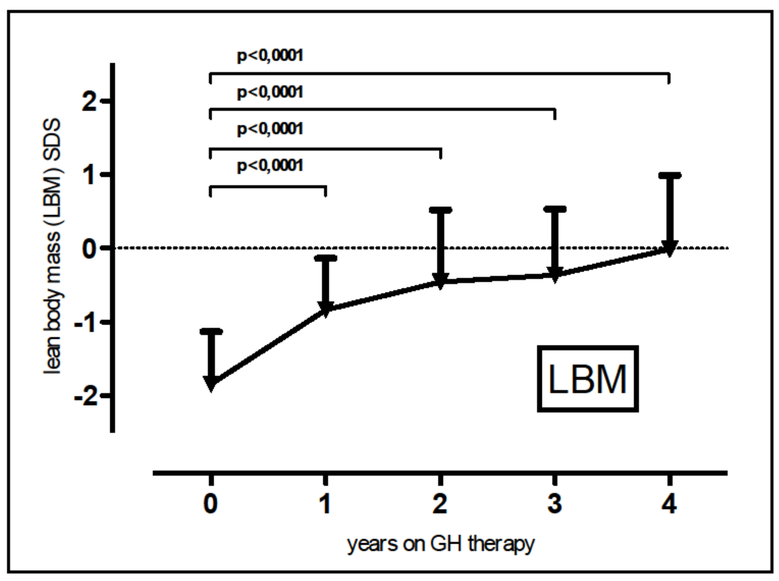
Results I:

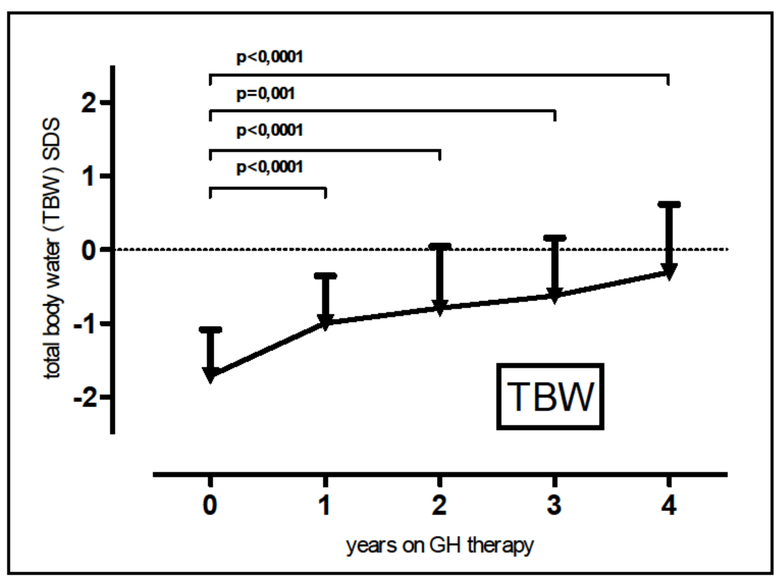
[median, IQR (25th; 75th perc.)]

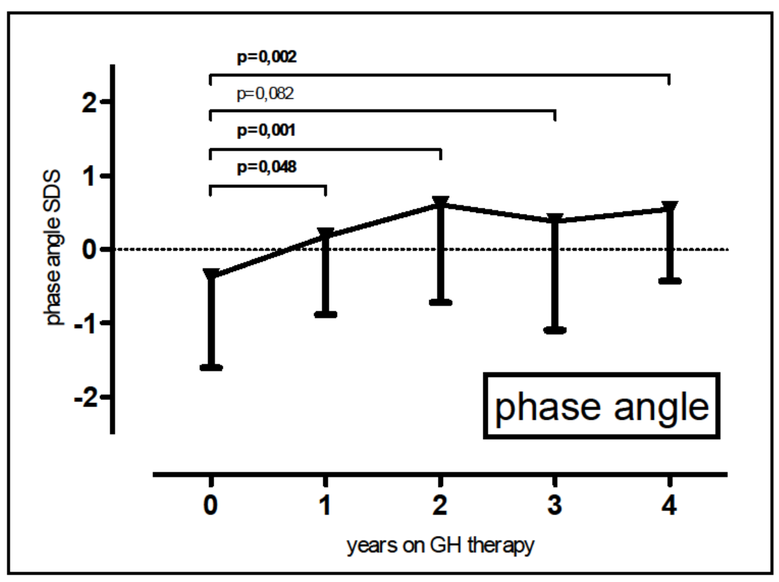
Height SDS and **BMI SDS** significantly increased (H: start -3.4 [-3.6, -3.0]; 1st yr -2.4 [-2.5, -2.0]; 4th yr -1.1 [-1.8, -0.7]; BMI: start -1.1 [-1.4, -0.5]; 1st yr -0.8 [-1.3, -0.3]; 4th yr -0.4 [-1.1, -0.7]).

Serum IGF-1 SDS and **IGFBP3 SDS** increased after start of GH (IGF-1: start -1.3 [-1.9, -0.4]; 1st yr 1.2 [-0.1, 2.4]; 4th yr 1.5 [0.3, 2.5]; IGFBP3: start -0.2 [-0.9, 0.4]; 1st yr 1.5 [0.6, 2.3]; 4th yr 1.3 [0.2, 1.9]).









Results II (graphs):

Parameters derived from **BIA** showed **decreasing body fat SDS** (start -0.7 [-1.4, 0.2]; 1st yr -1.7 [-2.5, -0.9]; 4th yr -1.6 [-2.1, -0.9]), **increasing lean body mass (LBM)**… …(start -1.9 [-2.4, -1.4]; 1st yr -0.76 [-1.3, -0.2]; 4th yr -0.2 [-0.7, 0.6]), **increasing total body water (TBW)** (start -1.8 [-2.1, -1.6]; 1st yr -0.9 [-1.3, -0.7]; 4th yr -0.6 [-1.0, 0.5]), and – as a measure for sufficient cell metabolism – an **increasing phase angle** (start -0.3 [-1.0, 0.5]; 1st yr 0.2 [-0.4, 0.8]; 4th yr 0.8 [0.3, 1.5]).

Conclusion: In SGA children on GH treatment, our data show a significant improvement of body composition in terms of body fat, lean mass and general cellular integrity.

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Growth Hormone

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