EFFECTS OF GH REPLACEMENT THERAPY ON BODY COMPOSITION AND MUSCLE HEALTH IN CHILDREN AND ADOLESCENTS WITH GH DEFICIENCY: ONE-YEAR PROSPECTIVE CASE-CONTROL STUDY.

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INTRODUCTION AND OBJECTIVES

The effects of GH deficiency (GHD) and GH replacement therapy (GHRT) on body composition and functional measures of physical fitness are largely unknown particularly in children.

Aim of the present study was to evaluate body composition, muscular strength and flexibility, and exercise tolerance in GHD children at baseline and after one-year GHRT.

PATIENTS AND METHODS

-- 19 children and adolescents with untreated GHD (mean age 10.5±1.7 years)

-- 19 healthy children (mean age 11.08±2.61 years) with normal GH reserve matched for age, stature and sex.

At study entry, all subjects underwent: anthropometric measurements, multifrequency bioimpedance, a battery of tests evaluating exercise capacity (6-minute walking test (6MWT)), muscle strength (handgrip, jumping, sit-to-stand tests (STS)) and flexibility (sit-and-reach test).

All the parameters were re-assessed after 1 year of GH treatment in GHD subjects.

RESULTS

- At baseline, GHD children had abnormal body composition, as indicated by higher values of waist-to-height ratio (WtHR) (0.50±0.08 vs 0.45±0.03, p=0.02), fat mass (FM) (26.99±6.03 vs 22.78±5.52 %, p=0.03), and lower fat-free mass (FFM) (22.45±5.11vs 28.68±7.39 kg, p=0.03), compared to controls (Table 1).

- GHD children exhibited lower hand-grip strength (11.29±3.49 vs 14.03±4.7 kg; p=0.04), vertical jump (12.78±4.17 vs 15.42±2.99 cm, p=0.03), long jump (104.91±28 vs 114.03±34.3 cm, p=0.03), and sit-and-reach test results (8.50±9.21 vs 14.50±7.75 cm, p= 0.03), 6MWT distance (505.31±67.25 vs 547.12±52.09 m, p=0.04) compared to controls, indicating reduced muscular strength and flexibility and exercise tolerance (Table 2).

- One-year GHRT in GHD patients improved body composition (FFM increased at 28.68±7.39 kg, p=0.004, while FM% and WtHR reduced at 22.61±6.84%, p=0.03, and 0.45±0.06, p=0.02, respectively), handgrip strength (14.56±4.91, p=0.001), vertical jump (16.02±4.81, p=0.03), long jump (120.81±34.73, p=0.03), 6MWT distance (603.31±79.45, p=0.005) and sit-and-reach results (15.60±8.95, p=0.02).

CONCLUSIONS

- Untreated GHD is associated with altered body composition, and a reduction in functional measures of physical fitness, such as muscle strength and flexibility, and exercise tolerance, which are much relevant for the patient's quality of life.
- GHRT may lead to a normalization of such functional parameters over 1 year.

TABLE 1

	Patients (n=19)	Controls (n=19)	P
Age (years)	10.5±1.7	11.1±1.9	ns
Height (SDS)	-2.0±0.8	1.3±0.8	<0.03
BMI (SDS)	0.4±1.1	0.5±1.1	ns
Waist-to-height ratio	0.5±0.08	0.45±0.03	0.02
FM (%)	26.9±6.0	22.8±5.5	0.03
FFM (kg)	22.4±5.1	26.7±7.4	0.03

TABLE 2

	Patients (n=19)	Controls (n=19)	P
Mean handgrip strength (kg)	11.3±3.5	14.0±4.7	0.04
Sit-and-reach (cm)	8.5±9.2	14.5±7.7	0.03
6MWT (m)	505.3±67.2	547.1±52.0	0.04
Vertical jump (cm)	12.7±4.1	15.4±2.9	0.03
Long jump (cm)	102.8±32.0	120.2±32.3	0.03