Effects of Growth Hormone Therapy on carbohydrate metabolism in Spanish Adults with Growth Hormone Deficiency

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BACKGROUND

Growth hormone deficiency (GHD) in adults is characterized by a tendency towards fat mass gain and may predispose to type 2 diabetes mellitus. GH replacement (GHR) is associated with impaired insulin sensitivity shortly after starting therapy, reflected by increased fasting glucose and insulin levels. Available evidence suggests that concerns regarding glucose intolerance in patients receiving long-term GHR have not been substantiated. However, several environmental and lifestyle-related factors could influence glucose abnormalities in patients with GHD, and no study has specifically addressed this issue in Spanish patients.

OBJECTIVES

We aimed to describe the evolution of carbohydrate metabolism (fasting glucose -FG- and glycated haemoglobin -HbA_{1c}-) and ascertain possible risk factors for developing glucose abnormalities in adult patients receiving GHR.

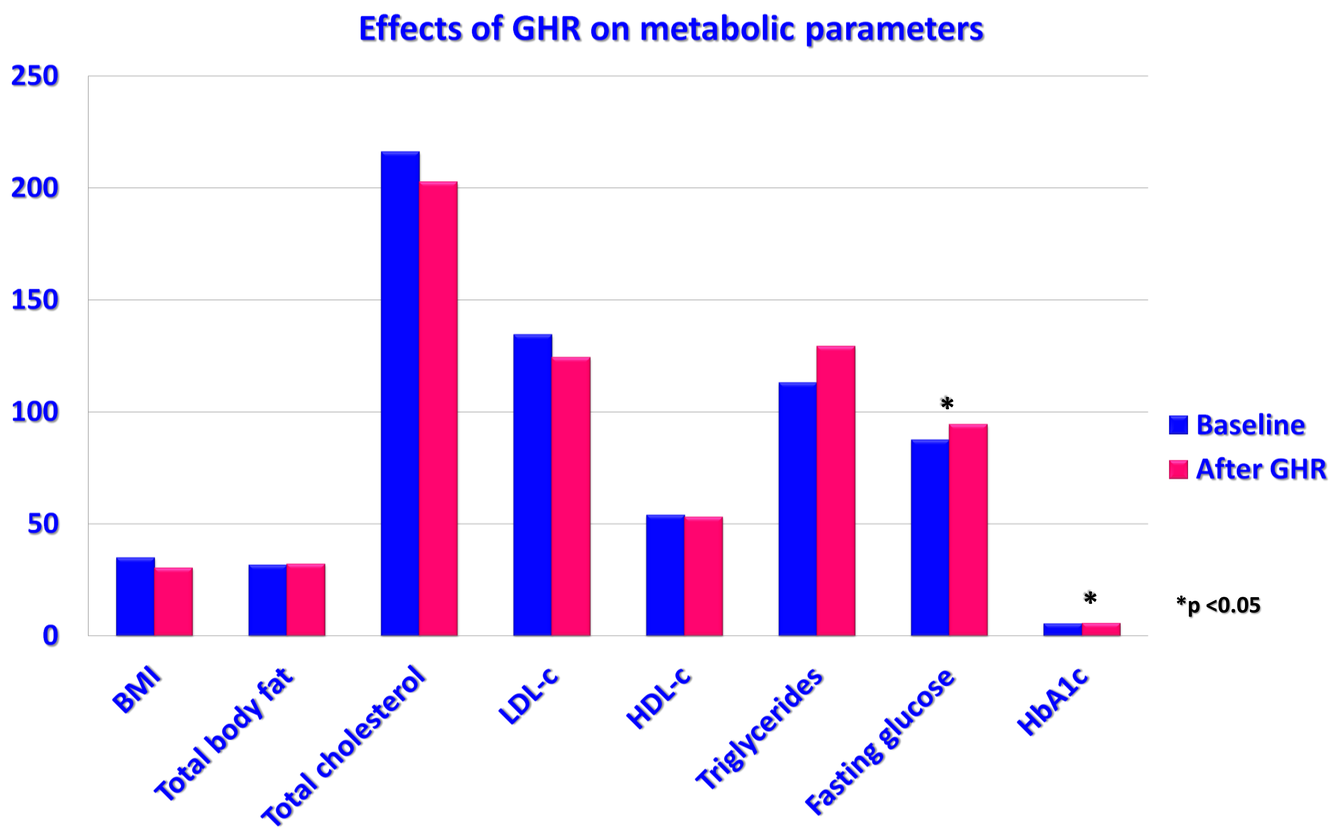
METHODS

We analyzed retrospectively 34 GDH adults from our centre who received GHR for at least two years (mean duration of treatment was 7.4 ± 3.5 years).FG, HbA_{1c} and anthropometric parameters were measured before starting treatment and at the end of the follow-up.
HbA_{1c} was measured by high-performance liquid chromatography. Intra-assay and inter-assay coefficients of variation (CVs) determined using representative blood samples with 5.9 and 10.3 % HbA_{1c} were 0.97 and 0.48 % respectively. Bio-impedance assessment was used to measure total body fat under standard conditions for all measurements.
Associations were tested by Mann-Whitney U test between baseline variables (age, BMI, total body fat, total cholesterol, low-density lipoprotein cholesterol, high-density lipoprotein cholesterol, triglycerides, mean maintenance dose of GH, and glucocorticoid replacement) and these metabolic variables.

RESULTS

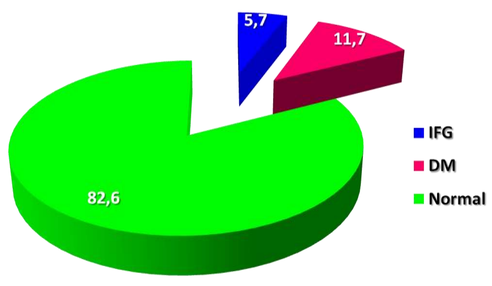
CHARACTERISTICS OF THE STUDY POPULATION

Baseline characteristics N=34	
Sex: male	18
Age (years)	40.4±13.5
BMI (Kg/m^2)	32.9±13.7
Total body fat (kg/%)	31.49±9
Total cholesterol (mg/dl)	215.8±45.5
LDL- cholesterol (mg/dl)	134.3±33.4
HDL-cholesterol (mg/dl)	53.75±14.5
Triglycerides (mg/dl)	112.8±58.0
Fasting glucose (mg/dl)	87.38±9.4
HbA_{1c} %	5.33±0.37
IGFI ng/dl	66.23±39.5



CHANGE IN CARBOHYDRATIC METABOLISM WITH GHR

Fasting glucose (mg/dl)	6.7±11.8	p=0.001
HbA_{1c} %	0.2±0.4	p=0.014



Glucocorticoid replacement and mean maintenance dose of GH (0.34 ±0.2 mg/day) weren't significantly related to the metabolic derangements.

CONCLUSION

Our results indicate that long-term GHR mildly increases FG and HbA_{1c} in a representative Spanish population. No predefined baseline traits were significantly related to the development of dysglucosis in adult patients receiving standard doses of GH, including glucocorticoid replacement.