**INTRODUCTION AND CLINICAL RELEVANCE**

Ghrelin is a peptide hormone mostly produced by the human stomach and currently subject of thorough research. It plays various roles in human physiology and disease such as hunger stimulation, growth hormone secretion, energy metabolism and cell proliferation. Moreover, it is involved in bone growth and metabolism\(^1\). Prader-Willi Syndrome (PWS) features include hyperphagia, severe obesity, growth delay, high scoliosis prevalence and hyperghrelinemia\(^2\). Patients with Adolescent Idiopathic Scoliosis (AIS) are often lean with high stature and low bone density\(^3\). Therefore, ghreline may be involved in the onset and/or progression of AIS.

The aim of our study was to compare ghrelin serum level in patients with and without AIS. We hypothesized that ghrelin serum level would be higher in AIS patients group.

**MATERIAL AND METHODS**

Institutional review board granted permission for this study. Forty-nine female patients were prospectively included in the AIS group and fifteen females with matching age represented the control group. The latter were healthy adolescents admitted in the department of surgery for a minor elective procedure. All patients included in the current study met the following criteria: no evidence of any endocrine disease or history of steroid intake. Chronologic age ranged twelve to seventeen years old in both AIS and control groups.

**Anthropometric Measurements.**

At study inclusion, subjects bare foot standing height was recorded on a wall-mounted stadiometer to the nearest millimetre. In AIS group, corrected height was computed by adjusting trunk loss using equation (1) (Bjure formula\(^3\)) where \(Y\) was the loss of trunk height (cm) caused by the spinal deformity, and \(x\) was the Cobb angle\(^4\) of the primary curve.

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\log Y = 0.011 \times x - 0.177
\]

Weight was measured on an electronic scale in the fasting state bare foot in normal indoor clothing to the nearest 0.1 kg. Body Mass Index (BMI) and corrected BMI were calculated.

**Biochemical assessment.**

Overnight fasting blood was obtained for ghrelin level determination for both AIS patients and controls. Serum specimens were obtained after centrifugation and stored at -80°C until assay. At the end of the study, total ghrelin was measured using a radioimmunnoassay (RIA; Phoenix Pharmaceuticals, Belmont, CA) with a 2 pg/ml detection limit.

**Statistical analysis.**

Data were reported as means \(\pm\) SD and \(p < 0.05\) was considered significant. As data were not normally distributed, we used the Wilcoxon rank sum test to compare the two samples.

**RESULTS**

Clinical features of both adolescents with AIS and controls were summarized in Table 1.

**Table 1: Physical characteristics and total circulating ghrelin levels in AIS and control groups depending on two age categories.** Values are shown as means \(\pm\) SD. Corrected height, corrected BMI and corrected BMI Z score in controls were equal measured values. Symbols indicate significant difference between AIS and controls. (*\(p < 0.05\); **\(p < 0.01\)).

As observed in Table 2, young AIS patients had a 34 % higher ghrelin level compared to young controls (231.5 \(\pm\) 93.4 vs 172.8 \(\pm\) 53.1; \(p = 0.05\)). In the second age group (14-17 years old) AIS patients had a 174 % higher ghrelin level compared to controls. (291.0 \(\pm\) 137.1 vs 106.2 \(\pm\) 46.0; \(p = 0.003\)).

**DISCUSSION AND CONCLUSION**

Results confirmed our initial hypothesis. Substantial increase of ghrelin serum level was measured in patients suggesting its participation in AIS physiopathology. In our knowledge, this result was original.

We assumed the implication of cell resistance to ghrelin, much alike resistance to melatonin hormone. This will be the central hypothesis of our biochemical studies in adolescent idiopathic scoliosis.

**REFERENCES**


Wilcoxon test analysis showed that AIS patients height was not significantly different from controls. However, corrected height calculated with the Bjure formula gave 5.1 cm difference, AIS patients being significantly taller than controls (163.2 \(\pm\) 7.3 vs 158.1 \(\pm\) 10.1; \(p=0.034\)). Other anthropometric data were not significantly different; therefore, both groups were fully comparable.

All forty-nine patients had at least one severe spinal curve with a mean Cobb angle of 56.1 (13.2) degrees. Twenty-five patients had a second curve with a mean Cobb angle of 54.2 \(\pm\) 12.9 degrees. All AIS patients included in the study had severe progressing scoliosis requiring surgical correction. Higher average level of total serum ghrelin was found in AIS group compared to the control group, with an 80 % difference (261.9 \(\pm\) 120.3 vs. 150.4 \(\pm\) 60.3; \(p=0.03\)).

Anthropometric parameters (height, corrected height, BMI, and corrected BMI) showed until fourteen years of age a similar and parallel evolution with age in both groups. After this age, point mean values were reversed between patients and controls. Therefore, we decided to separate data in two age groups, before and after fourteen years old. Table 2 represented physical characteristic and total circulating ghrelin levels in AIS and control groups.

**Table 2: Physical characteristics and total circulating ghrelin levels in AIS and control groups depending on two age categories.**

Table: Physical characteristics and total circulating ghrelin levels in AIS and control groups depending on two age categories. Values are shown as means \(\pm\) SD. Corrected height, corrected BMI and corrected BMI Z score in controls were equal measured values. Symbols indicate significant difference between AIS and controls. (*\(p < 0.05\); **\(p < 0.01\)).

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