

Bone and Endocrine Profile in Adolescent Girls with Anorexia Nervosa

Endocrine and Bone Metabolism at Baseline in Adolescent Girls with Restrictive Anorexia Nervosa: A Retrospective Cohort Study

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Abstract

Background: Adolescence is a critical period for bone accrual and endocrine maturation. Restrictive anorexia nervosa (AN) may impair growth, skeletal development, and hormonal regulation. We evaluated baseline anthropometric, skeletal, and biochemical characteristics in adolescent girls with restrictive AN.

Methods: Retrospective cohort study of anonymized clinical data collected between 2013 and 2019. Female adolescents with restrictive AN were included (n=134). Variables included age, BMI, BMI standard deviation score (BMI-SDS), IGF-1, bone age, DEXA registration status, calcium, phosphate, cortisol, vitamin D, calcitonin, alkaline phosphatase, and PTH. Missing data were excluded from variable-specific analyses. Descriptive statistics and exploratory correlations were performed.

Results: Mean age was 14.46 ± 1.61 years. Mean BMI was 15.43 ± 1.90 kg/m², corresponding to a mean BMI-SDS of -2.1 ± 0.8 . 63% of patients were below -2 SD and 21% below -3 SD, indicating severe malnutrition. IGF-1 data were available in 86 patients and showed a significant positive association with BMI (Pearson $r=0.374$, $p=0.00043$; Spearman $\rho=0.429$, $p=0.00004$). Patients with BMI <15 had significantly lower IGF-1 levels than those with BMI ≥ 15 (111.9 vs 148.7; $p=0.0021$). Bone age was available in 74 patients and was delayed in 40.5%. Calcium and phosphate values were generally within normal ranges.

Conclusions: Adolescent girls with restrictive AN presented with marked undernutrition and significant suppression of the anabolic growth axis, reflected by lower IGF-1 at lower BMI. Bone maturation was heterogeneous, with delayed skeletal development in a substantial subgroup. Early endocrine and skeletal assessment at diagnosis is recommended.