Clinical Risk Factors for Osteoporosis in Type 1 Diabetes

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OBJECTIVES

Introduction: Type 1 diabetes secondary osteoporosis is an underdiagnosed condition and there are few studies that addressed the topic of clinical risk factors in this context, although, for a better diagnosis and management, it is of great importance to find such predictors.

Aim: To evaluate bone mineral density and parameters of bone metabolism in patients with type 1 diabetes in comparison with a group of healthy subjects and to determine possible risk factors for osteoporosis in the context of type 1 diabetes.

METHODS

Patients:

102 patients with type 1 diabetes and 59 healthy controls (pre-menopausal women and men, aged between 20 and 55 years), matched by age, sex and BMI were included in the study.

All subjects with secondary causes of osteoporosis except type 1 diabetes and diabetic patients with stage 3 nephropathy or more (GFR< 60 ml/min/1.73 m²) were excluded.

Assessment: their lifestyle, personal and parental history were evaluated with a questionnaire, anthropometric measurements were made and DXA osteodensitometry was performed. Serum osteocalcin, intact PTH, 25(OH) vitamin D, total calcium, phosphorus and magnesium were determined.

RESULTS

The risk for low BMD (at least a Z score equal or lower than -2.0 SD at any site) was 1.2 higher in type 1 diabetes (95% CI 0.43-3.33), however BMD was not significantly different between patients and controls (p=0.88 for lumbar spine and 0.56 for femoral neck). Type 1 diabetic patients had a median age of 28 and 11.5 years disease duration. Median HbA1c was 8.1 %. BMD for a disease duration over 10 years was significantly lower than that for 0.5-5 yrs (p=0.008, ANOVA). Diabetic nephropathy (stages 1 and 2) increased the risk for low BMD and was associated with a significant rise of PTH. Age was negatively associated with lumbar spine BMD and positively with PTH. BMI was positively associated with BMD at all sites.

CONCLUSIONS

The most important predictors for osteoporosis in our study were type 1 diabetes duration (over 10 years) and the presence of diabetic nephropathy. Age towards the upper limit of inclusion (i.e. 55 years old) or low BMI values (low/normal) may complete an indication for performing DXA in type 1 diabetic patients. Long-term lifestyle measures that we found to be protective for osteoporosis were: avoiding coffee and alcohol consumption, regular exercise and an optimal metabolic control of diabetes.