Circulating myostatin in type 2 diabetes subjects: relationship with bone metabolism and fractures

R Reyes-García1, A García-Martín1, B García-Fontana1, S Morales-Santana1, Pedro Rozas-Moreno1, M Muñoz-Torres1
1Bone Metabolic Unit (RETICEF), Endocrinology Division, Hospital Universitario San Cecilio, Granada (Spain).
2Endocrinology. Hospital General Universitario Rafael Méndez, Lorca, Murcia, Spain.
3Endocrinology, Hospital Comarcal del Noroeste, Caravaca de la Cruz, Murcia, Spain.
5Endocrinology. Hospital General de Ciudad Real, Ciudad Real, Spain.

BACKGROUND AND OBJECTIVES: Myostatin (growth differentiation factor 8, GDF-8) has an important role in the regulation of muscle mass, and mice lacking the myostatin gene show a generalized increase in bone density and strength. Type 2 diabetes subjects have an increased risk of fragility fractures despite of higher bone mass. Taking into account the myostatin influence in bone strength a better understanding of myostatin actions in type 2 diabetes is of interest. Our aims were to evaluate serum myostatin concentrations in type 2 diabetes patients, and to explore its relationship with bone mineral density (BMD), bone turnover markers and fractures.

DESIGN, SETTING AND PATIENTS: Cross-sectional study including 73 patients with type 2 diabetes mellitus.

• Lumbar spine and femoral bone mineral density (BMD) were measured by dual X-Ray absorptiometry (Hologic QDR 4500). World Health Organization criteria for osteoporosis were used.

• Serum myostatin was measured using quantitative sandwich enzyme-linked immunosorbent assay (ELISA) developed by R&D systems (Minneapolis, MN, USA) according to the manufacturer’s instructions. The assay sensitivity is 5.32 pg/mL and the assay range is 31.3 - 2,000 pg/mL. Intra-assay and inter-assay variability were of 5.6% and 6%, respectively.

• Bone turnover markers were measured as follows: total osteocalcin by radioimmunoassay (DiaSorin, Stillwater, Minnesota USA); bone alkaline phosphatase (BSAP) by an enzyme-linked immunosorbent assay (Tandem-R Ostase Tm; Hybritech Europe, Liege, Belgium); serum carboxy-terminal cross-linked telopeptide of type I collagen (CTX) by enzyme immunoassay (Elecys [beta] CrossLaps; Roche Diagnostics SL, Barcelona, Spain) and tartrate-resistant acid phosphatase 5b (TRAP5b) (Bone TRAP® Assay IDS Ltd).

RESULTS:

Table 1. Clinical, anthropometric and biochemical parameters of study subjects.

Table 2. Correlation coefficients (Pearson’s coefficient) between bone turnover markers and DXA parameters with serum myostatin levels.

CONCLUSIONS:

1) Our data does not support an association between serum myostatin and bone parameters in type 2 diabetes. A true lack of relationship in humans may be an explanation, although a disrupted regulation of this pathway in type 2 diabetes may also take place.