Handgrip strength identificates type 2 diabetes mellitus patients with higher fracture risk .

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Abstract

Patients suffering from type 2 diabetes mellitus (T2DM) show increased fracture risk in comparison with healthy subjects. Bone mineral density (BMD), as measured by DXA, may be not enough to discriminate T2DM patients with higher fracture risk. Our aim was to investigate whether handgrip strength may be associated with bone health in T2DM patients. Anthropometric data and information about metabolic control and diabetic complications were recorded. Handgrip strength by dynamometer, FRAX derived 10-years probability of major osteoporotic fractures and hip fractures were also assessed. Bone evaluation was performed by a dual-energy X-ray absorptiometry (DXA) densitometer at the lumbar spine (L1-L4) and at the femoral neck; based on specific software, the trabecular bone score (TBS) was calculated. Lateral scan of thoracic and lumbar spine was assessed to investigate morphometric vertebral fractures (Vfx). 29 patients (female 65%) [median age 67 (60 to 70)] with T2DM were considered. Morphometric vertebral fractures were detected by DXA in 17% of patients without gender differences. The median ten years probabilities of fractures were 8.1% and 2.3% as for major osteoporotic or hip fracture respectively. Median femoral neck T-score value [-1.1 SD (-1.8 to -0.5)] was indicative of osteopenia, while lumbar spine T-score was observed even in the normal range [-0.8 SD (-1.5 to -0.1)]. TBS was positively associated with BMD at lumbar spine and femoral neck. Median handgrip strength value was 22.3 kg (18.9 to 31.3). At multiple regression analysis, handgrip strength predicted both lumbar (β=0.009, SE 0.0034, p=0.01) and femoral neck BMD values (β=0.006, SE 0.002, p=0.01). Age (β=-0.008, SE 0.002, p=0.007) and handgrip strength (β=0.01, SE 0.002, p=0.0001) were also independently associated with TBS score, after correcting for mean HbA1c values and time since T2DM diagnosis. These findings suggest that handgrip strength may be a reliable tool to investigate bone fragility in T2DM.

Recent Publications

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3. Ferrari SL, Abrahamsen B, Napoli N et al. Diagnosis and management of bone fragility in diabetes: an emerging challenge. Osteoporos Int. 2018 Dec;29(12):2585-2596.

4. Schacter GI, Leslie WD. DXA-Based Measurements in Diabetes: Can They Predict Fracture Risk? Calcif Tissue Int. 2017 Feb;100(2):150-164.

5. Valentini A, Cianfarani MA, De Meo L et al. FRAX tool in type 2 diabetic subjects: the use of HbA_{1c} in estimating fracture risk. Acta Diabetol. 2018 Oct;55(10):1043-1050.

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7. Diacinti D, Del Fiacco R, Pisani D et al. Diagnostic performance of vertebral fracture assessment by the lunar iDXA scanner compared to conventional radiography. Calcif Tissue Int. 2012 Nov;91(5):335-42.



Biography

Dr Federica Bellone is a geriatrician who works as Ph.D. student at the Geriatrics Unit of University of Messina (Italy). Her research activity is mainly oriented towards the fields of mineral and bone metabolism, osteoporosis, fragility and consequences of aging. She published several works about osteoporosis with emphasis on the study of clinical predictors of fragility fractures in different clinical scenarios. Current research interest is focused on the identification of bone fragility in adult subjects with type 2 diabetes mellitus.

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