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TYPE 2 DIABETES AND OSTEOSARCOPENIA: DOUBLE TROUBLE? A CROSS-SECTIONAL PILOT STUDY IN MALAYSIA

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Dorothy Maria Anthony Bernard,[1] Terence Ing Wei Ong,[1] Lee Ling Lim,[1] Jeyakantha Ratnasingam,[1] Luqman Ibrahim,[1] Hui Min Khor,[1] Wai Yee Chan,[1] Mohammad Nazri Md Shah,[1] Dr Pavai Sthaneshwar,[1] Christine Shamala Selvaraj,[1] Karuthan Chinna,[2] Shireene Ratna DB Vethakkan,[1] Sharmila Sunita Paramasivam[1]

[1]*University Malaya, Kuala Lumpur, Malaysia*

[2]*University College Sedaya International, Kuala Lumpur, Malaysia*

INTRODUCTION

Osteoporosis/osteopenia commonly co-exists with sarcopenia resulting in an increased risk of falls and fractures. Given the high prevalence of type 2 diabetes mellitus (T2DM) in Malaysia and emerging evidence that T2DM is associated with sarcopenia and increases fracture risk beyond association with BMD, we designed a cross-sectional study to examine the prevalence of osteosarcopenia in patients with T2DM versus those without T2DM in a Malaysian cohort.

METHODOLOGY

Two hundred patients aged ≥50 years with BMI ≥18.5 kg/m^2 were recruited into two groups: the T2DM group (T2DMG), n=100, and the control group (CG), n = 100. Both groups were age and sex-matched with similar demographics and baseline characteristics. A detailed history of T2DM, history of falls, fragility fractures, sarcopenia assessment by muscle mass and muscle function assessment, osteoporosis assessment by bone mineral density, body composition measurement, HbA1c, bone turnover markers, serum calcium, and 25-OH Vitamin D were collected.

RESULTS

Both groups had similar median age [T2DMG vs CG: 65 (59-70) years vs 65 (59-69) years]. The median HbA1c in the T2DM group was 7.4 (6.6-8.5) %. Patients with T2DM had a significantly higher median weight [70.9 (63.4-81.1) kg], median BMI [26.9 (24.3-30.6) kg/m^2], mean waist circumference (94.4 ± 11.7cm), and median waist to hip ratio [0.93 (0.88-0.96)] compared to the control group. There was a higher number of falls in the T2DM group (31.0%, n=31) versus the control group (23.0%, n = 23), however, the number of vertebral fractures was higher in the control group (T2DMG vs CG [(n = 1,1.0%) vs (n = 3, 3.0%), p = 0.621]. Bone turnover markers were significantly lower in subjects with T2DM [PINP; T2DMG vs CG: 39.12 (30.66-50.12) µg/L vs 52.14 (40.76-63.27) µg/L, p <0.001; CTX; T2DMG vs CG: 298.15 (230.45-414.60) pg/mL vs 383.55 (304.98-568.23) pg/mL, p<0.001]. Participants with T2DM also had significantly higher BMD and T-scores. There was a significantly reduced physical performance (measured by 5 times chair stand test ≥12 seconds) in the T2DM group(33.0%, n = 33) as compared to the control group (18%, n = 18), p = 0.015 and remained significant among the male patients in both groups (p = 0.027). The prevalence of osteoporosis measured by BMD was significantly higher among the controls in comparison to patients with T2DM (p = 0.044). 32.0% (n = 32) of the subjects with T2DM had sarcopenia versus 27.0%(n=27) in the control group (p = 0.438). The prevalence of osteosarcopenia was similar between groups.

CONCLUSION

Our study demonstrated similar rates of osteosarcopenia between patients with T2DM in comparison to non-diabetics. However, osteoporosis measurement with BMD (DEXA) may underrepresent the true burden of disease. Our observations highlight the importance of assessing bone quality with a trabecular bone score or high-resolution peripheral quantitative CT scan in T2DM patients to avoid missing a diagnosis of osteosarcopenia and its associated risks of falls and fractures. Bone turnover markers were reduced in patients with T2DM indicative of reduced bone remodeling and increased fracture risk. Despite the patients with T2DM being mostly in the overweight or obese category, they had poorer physical performance, especially in men which increases their risk of falls and fractures.

KEYWORDS

Type 2 diabetes mellitus, osteosarcopenia, bone mineral density, bone turnover markers, falls and fracture risk.