Applied nutritional investigation

Psoas muscle index predicts osteoporosis and fracture risk in individuals with degenerative spinal disease

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ABSTRACT

Objectives: Skeletal muscle loss and osteoporosis are major medical and socioeconomic concerns as the global population ages. Studies have reported that skeletal muscle mass correlates to bone mineral density (BMD). The psoas muscle index (PMI), measured as the L3 cross-sectional areas of the right and left psoas divided by the square of height, has a positive correlation with the total volume of skeletal muscle in the body. This study aimed to evaluate relationships between PMI and BMD and fracture risk estimated by the Fracture Risk Assessment Tool (FRAX).

Methods: Preoperatively acquired, plain computed tomography images at the L3 level were used to measure PMI in 87 people with degenerative spinal diseases. We evaluated the correlation between PMI and BMD and fracture risk estimated by FRAX.

Results: PMI was significantly correlated with BMD in the entire lumbar spine and femoral neck ($r = 0.413$ and 0.525, both $P < 0.001$). People with osteoporosis showed significantly lower PMI than those without ($P < 0.05$). PMI was also significantly correlated with FRAX score ($r = -0.545$, $P < 0.001$). Furthermore, based on the recommendation of osteoporosis treatment, participants were divided into two groups: FRAX $\geq 15\%$ (R group) and FRAX $<15\%$ (C group). The R group showed significantly lower PMI than the C group ($P < 0.001$). Receiver operating characteristic curve analysis revealed that PMI has moderate accuracy in diagnosing osteoporosis and FRAX $\geq 15\%$.

Conclusions: PMI was significantly associated with BMD and fracture risk. PMI measurement is straightforward and may increase the diagnosis rate of osteoporosis and fracture risk.

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