

TITLE: The association between sarcopenia and balance in patients with thoracolumbar compression fracture

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INTRODUCTION: Sarcopenia is a condition that causes muscle weakness as people age and increases the risk of falls. Thoracolumbar vertebral compression fracture (VCF) is associated with sarcopenia and osteoporosis. This study evaluated the relationship between sarcopenia and balance in patients with thoracolumbar VCF.

METHODS: The study protocol was approved by the Ethics Review Board of Shiobara Spring Hospital. This retrospective study enrolled patients admitted to our institution for thoracolumbar VCF between October 2016 and March 2021. Our study was consistent with the principles of The World Medical Association Declaration of Helsinki for medical research involving human subjects. We included patients admitted for rehabilitation treatment with a diagnosis of thoracolumbar VCF. The exclusion criteria were as follows: (1) pathological fracture, including fractures related to malignancy, infection, or other medical conditions; (2) burst fracture with retro-pulsed bony fragment into the spinal canal; (3) neurological deficit; (4) use of steroids or medications for severe liver or kidney disease; and (5) no measures of fitness. On admission, the grip strength, gait speed, Barthel Index (BI), Berg Balance Scale (BBS), Numerical Rating Scale (NRS) for body pain, and calf circumference were measured. Sarcopenia was diagnosed according to the 2019 Asian Working Group for Sarcopenia guidelines by measuring grip strength, walking speed, and skeletal muscle mass index (SMI) using the Imbody S-10.

RESULT: A total of 112 patients (86 females, 26 males) with a mean age of 83.3 years old were enrolled at one institution. The prevalence of sarcopenia was 61.6% (69 with sarcopenia [sarcopenia group] and 43 without sarcopenia [non-sarcopenia group]). The sarcopenia group was older (85.4 ± 6.3 vs. 80.1 ± 8.9 years), had a lower SMI (4.7 ± 0.8 vs. 6.3 ± 1.0), shorter height (148.2 ± 7.9 cm vs. 153.3 ± 9.1 cm), lower weight (45.5 ± 7.0 kg vs. 59.0 ± 23.5 kg), and lower grip strength (12.3 ± 5.3 kg vs. 20.1 ± 7.6 kg) than the non-sarcopenia group. The sarcopenia group also had a significantly lower BI (53.0 ± 23.3 vs. 66.9 ± 23.5 cm), BBS (17.0 ± 14.1 vs. 33.9 ± 18.3), and calf circumference (27.5 ± 2.6 cm vs. 31.3 ± 4.6 cm) and significantly higher NRS (6.3 ± 2.5 vs. 5.5 ± 2.1) than the non-sarcopenia group.

DISCUSSION: Sarcopenia was present in 61.6% of patients hospitalized for thoracolumbar VCF. Compared with the sarcopenia group, the non-sarcopenia group had a significantly higher BBS score as a measure of balance. In patients with thoracolumbar VCF, sarcopenia is associated with decreased mobility and poor balance.

SIGNIFICANCE: Sarcopenia in patients with thoracolumbar VCF was associated with poor balance.