Abstract

Evaluating vertebral bone mass and quality in the elderly poses challenges due to degenerative changes. This study aims to elucidate the usefulness of the trabecular bone score (TBS) by examining the relationship between bone mineral density (BMD), TBS, and Hounsfield unit (HU) values. A retrospective analysis of 599 vertebrae from 152 patients (mean age 69.0 years; range 44–89; 74 males and 78 females) undergoing dual-energy X-ray absorptiometry (DXA) and CT scans was conducted. Vertebrae were categorized into three grades based on the degree of degeneration. The TBS was calculated from DXA images, and the HU value was measured by placing a region of interest on an axial image of the vertebral mid-body. One-way analysis of variance and Pearson's correlation tests were employed to investigate the relationship between BMD and TBS or HU values. While lumbar BMD significantly increased ($p < 0.01$) with degenerative changes, TBS and HU values showed no significant differences. The correlations between lumbar BMD and TBS values, and between BMD and HU values, were stronger without degenerative changes than with degenerative changes. Significantly different HU values were observed between the right and left sides of severely degenerated vertebrae. Severe degenerative changes, particularly those associated with sclerosis, may impact HU values. TBS exhibits greater potential than HU values as a complementary tool.