CT Bone Mineral Density Is Independently Associated with Adverse In-Hospital Outcomes in Dutch Level I Trauma Patients

Tim Kobes, MD*; Arthur A.R. Sweet, MD; Sophie Brigitte Helena Verstegen, BS; Marijn Houwert, MD; Wouter B. Veldhuis, MD; Luke Leenen, FACS; Pim De Jong, MD; Mark Van Baal, MD*
University Medical Center Utrecht, Utrecht, NETHERLANDS

Purpose: Our objective was to assess the association of CT-determined bone mineral density (BMD) values of the first lumbar vertebra and in-hospital complications and outcomes in trauma patients.

Methods: All consecutive hospitalized trauma patients (≥16 years) who underwent CT imaging within 7 days of admission in 2017 were included. Patients with an active infection or antibiotic treatment upon admission, severe neurologic trauma, or an unassessable vertebra were excluded. BMD at the first lumbar vertebra was determined on CT by placing a circular region of interest in homogeneous trabecular bone to obtain mean Hounsfield units (HU). Regression analyses were performed to assess the association of BMD with in-hospital complications and outcomes.

Results: In total, 410 patients were included (median age 49 years [interquartile range, 30-64], 68.3% men, mean BMD 159 ± 66 HU). A total of 94 complications, primarily infection-related, were registered among 74 patients. After adjustment for covariates, a decrease of BMD by 1 standard deviation was significantly associated with increased risk of complications (odds ratio [OR] 1.9), pneumonia (OR 2.2), delirium (OR 4.5), and ICU admission (OR 1.8).

Conclusion: Bone mineral density of the first lumbar vertebra is independently associated with in-hospital complications, pneumonia, delirium, and ICU admission. These findings aid the early identification of patients at risk and build a premise for preventative strategies.