Using the DGOU Osteoporosis Fracture (OF) Classification System to Predict Osteoporotic Vertebral Fracture Collapse

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INTRODUCTION:
Osteoporotic vertebral compression fractures (OVCFs) are a common complication of osteoporosis, often leading to chronic pain, height loss, impaired function, and increased comorbidities. Although risk factors for OVCFs have been widely studied, there is no standardized method for predicting vertebral collapse. In 2010, the Spine Section of the German Society for Orthopedics and Trauma (DGOU) developed the Osteoporosis Fracture (OF) classification system to identify anatomical abnormalities associated with increased risk of collapse. In this study, we used the OF classification system to not only stratify a cohort of 3,558 OVCF patients but also identify possible significant relationships between OF classification and risk of vertebral collapse.
METHODS: Following institutional review board approval (#23-0902), the charts of 3,558 patients with OVCFs were screened. Patients were excluded if they were < 65 years of age, had metastatic disease, multiple fractures, high-impact injuries, fractures above T8, or prior thoracic/lumbar spine surgery. The included patients' CT and MRI imaging was then analyzed and OVCFs were classified using the OF system. Vertebral collapse was defined as vertebral compression ratio (VCR) > 20% or anterior height compression (AHC) > 20%. Fisher's exact test was performed using R version 4.3.2 to assess statistical significance ($p < 0.05$) between OF classification and collapse status.
RESULTS: Of the 3,558 patients, 558 met the inclusion criteria. According to VCR%, vertebral collapse rates were ~20% for OF2, ~40% for OF3, and ~66% for OF4 ($p < 2.2e-16$). According to AHC%, vertebral collapse rates were ~16% for OF2, ~40% for OF3, and ~72% for OF4 ($p < 2.2e-16$). Classifications OF1 and OF5 were rare ($n = 2$ each). Both OF1 cases were stable, while both OF5 cases had collapsed.
DISCUSSION AND CONCLUSION: Our findings highlight the OF classification system's utility in predicting OVCF collapse risk. Higher OF classifications were strongly associated with increased collapse rates according to both VCR% and AHC%. This suggests that the OF system is a practical, objective tool for clinical decision-making. Patients with higher OF classifications may benefit from close monitoring and targeted interventions to reduce the risk of vertebral collapse and its associated morbidity.