

## Assessment of Bone Mineral Density in Patients with Chronic Kidney Disease

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### Abstract

The aim of this study was assessment of prevalence of bone mineral density (BMD) decrease in patients with different stages of chronic kidney disease (CKD), detection of correlation between densitometry results and clinical, laboratory and ultrasound exam data, as well as comparison of BMD measurements obtained using different methods.

165 patients with CKD (67 patients with CKD 1–5 stage and 98 patients with CKD stage 5 D on dialysis) were examined. To assess BMD, all patients received dual-energy X-ray absorptiometry (DXA) of the lumbar spine and proximal femur and quantitative ultrasound (QUS) of calcaneus. 38 patients with CKD stage 5 D also had quantitative computed tomography (QCT) of the lumbar spine.

High prevalence of BMD decrease was demonstrated using DXA. Progressive decrease of BMD was detected as kidney function worsened with significant difference between pre-dialysis and dialysis groups of patients. Osteoporosis frequency in patients with CKD stage 5 D was statistically higher ( $p = 0,012$ ).

BMD was affected the most by patient age and kidney disease duration. Patients treated with peritoneal dialysis had lower BMD compared to patients treated with hemodialysis ( $p = 0,007$ ).

Both high and low levels of parathyroid hormone had negative influence on the bone tissue with the lowest BMD detected in patients with laboratory signs of secondary hyperparathyroidism.

Correlation was established between BMD and blood vessel and heart valve calcification as well as with pulse wave velocity. Robust correlation between DXA, QUS, and QCT results was demonstrated. However, presence of the abdominal aorta calcinosis significantly decreased such correlation between DXA and QCT..

**Key words:** Bone Mineral Density, Dual X-ray Absorptiometry, Quantitative Computed Tomography, Quantitative Ultrasound, Chronic Kidney Disease, Dialysis.

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