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Risk Factors and Clinical Prediction Models for Osteoporosis in Predialysis Chronic Kidney Disease Patients

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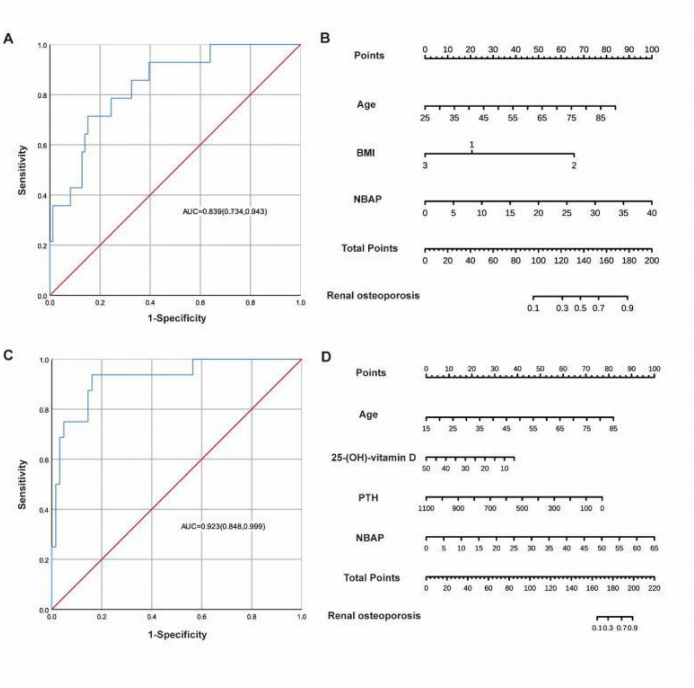
Objectives : The research concerning osteoporosis among individuals with predialysis chronic kidney disease (CKD) has been relatively neglected in existing literature. Furthermore, the risk factors for osteoporosis in this demographic have not been adequately investigated. The objective of this study was to explore the risk factors associated with osteoporosis in predialysis CKD patients and to construct a predictive model capable of estimating the likelihood of osteoporosis in these individuals.
Methods : A retrospective study was conducted on 326 predialysis CKD patients. Relevant clinical examination results and measurements of bone mineral density (BMD) using dual-energy X-ray absorptiometry were collected. Binary logistic regression was utilized to explore the risk factors associated with osteoporosis and to develop predictive models.
Results : In male predialysis CKD patients, age represents a risk factor, while 25-(OH)-Vitamin D acts as a protective factor against osteoporosis. Among female patients, age, underweight status, NBAP, and advanced CKD (G5) are significant risk factors for osteoporosis, whereas PTH serves as a protective factor. In pre-dialysis CKD patients in stages CKD1-4, age, underweight status, and NBAP are identified as risk factors for osteoporosis. For G5 predialysis patients, advanced age and NBAP pose a high risk of osteoporosis, while 25-(OH)-Vitamin D and PTH exhibit protective effects. Additionally, nomogram models illustrating the risk of osteoporosis in pre-dialysis patients of different genders and renal function stages were created.
Conclusions : Age, underweight, severity of renal dysfunction, NBAP, PTH, and 25-(OH)-vitamin D are strongly associated with osteoporosis in predialysis CKD patients

Binary logistic regression analysis on the correlation between related indicators and osteoporosis in predialysis patients with different renal function stages_00.jpg

Study objects	variable	β value	P value	OR	95%CI
G1-4	Age	0.07	0.02	1.07	(1.01,1.13)
	NBAP	0.13	0.02	1.14	(1.02,1.28)
	Underweight	2.39	0.03	10.88	(1.28,92.46)
G5	Age	0.13	0.004	1.14	(1.04,1.24)
	25-(OH)-vitamin D	-0.16	0.05	0.85	(0.73,1.00)
	PTH	-0.01	0.04	0.99	(0.97,1.00)
	NBAP	0.277	0.017	1.32	(1.05,1.65)

Binary logistic regression analysis on the correlation between related indicators and osteoporosis in predialysis patients with different renal function stages_00.jpg


A
Sensitivity
1-Specificity
AUC=0.839(0.734,0.943)
B
Points
Age
BMI
NBAP
Total Points
Renal osteoporosis
C
Sensitivity
1-Specificity
AUC=0.923(0.848,0.999)
D
Points
Age
25-(OH)-vitamin D
PTH
NBAP
Total Points
Renal osteoporosis