

크레아티닌을 이용한 추정 사구체 여과율과 만성 신부전 환자의 미네랄-뼈질환과의 상관성

연세대학교 의과대학 내과학교실¹, 서울대학교 의과대학 내과학교실²

권영은¹, 박경숙¹, 김영리¹, 류한작¹, 이미정¹, 한승혁¹, 유태현¹, 안규리², 최규현¹

Creatinine-based Estimated Glomerular Filtration Rate Correlates with Mineral and Bone Disorder in Chronic Kidney Disease

Young Eun Kwon¹, Kyoung Sook Park¹, Yung Ly Kim¹, Han Jak Ryu¹, Mi Jung Lee¹
Seung Hyeok Han¹, Tae-Hyun Yoo¹, Curie Ahn², Kyu Hun Choi¹

Department of Internal Medicine¹, Yonsei University College of Medicine
Department of Internal Medicine², Seoul National University

Background: Mineral and bone disorder (MBD) develops from early stage of chronic kidney disease (CKD). Osteopenia is highly prevalent in general population, especially in elderly CKD patients, and these two factors could increase risk of fracture and influence on worse clinical outcomes. It is well known that CKD-MBD correlates with decline of glomerular filtration rate (GFR). Nowadays, four kinds of estimated GFR (eGFR) equations are used in clinical practice, and we investigated the difference of correlation with bone mineral density (BMD) in CKD patients.

Methods: This study was based on the data from a multi-center, prospective cohort study, KNOW-CKD (KoreaN cohort study for Outcome in patients With Chronic Kidney Disease). The patients were enrolled from 2011 to 2014, and BMD was measured in all patients at the time of enrollment. The patients were classified into two groups, normal and osteopenia with cutoff T-score of -1.0 at pre-defined points (hip and femur neck). We analyzed four methods of GFR estimation; 1) Modification of Diet in Renal Disease (MDRD), 2) CKD-Epidemiology Collaboration (CKD-EPI) creatinine equation (EPI-Cr), 3) CKD-EPI cystatin C equation (EPI-Cys), and 4) CKD-EPI equation based on both creatinine and cystatin C (EPI-Cr/Cys). Pairwise comparison of the area under the receiver operating characteristic curves (AUC) was used to find the best method to correlate with osteopenia by MedCalc® software.

Results: Among 1,529 patients, 1,425 (hip) and 1,469 (femur neck) patients were examined in BMD. The mean age was 53.6±12.4 years and male was 61.5% (n=941). The number of the patients diagnosed with osteopenia was 264 (18.5%, hip) and 444 (30.2%, femur neck), respectively. As comparing AUC according to eGFR methods, EPI-Cr showed the largest AUC to correlate with osteopenia at hip (0.703, all p<0.001) and at femur neck (0.694, all p<0.01). In subgroup analysis of the group aged over 50 years, EPI-Cr method among the 4 types of eGFR assessment showed the similar trends, the largest AUC at hip (0.672, all p<0.001), and at femur neck (0.654, all p<0.001).

Conclusion: EPI-Cr is the most powerful method to correlate with osteopenia in CKD patients, suggesting creatinine-based eGFR might be a useful tool to assess the risk of skeletal related events in CKD patients.

Key Words: 사구체 여과율, 골감소증, 혈청 크레아티닌

Estimated glomerular filtration rate, Osteopenia, Creatinine