

OP 01

Correlation of eGFRs Estimated by Different Equations based on Creatinine and Cystatin C in Patients on Haemodialysis Treatment

Wanniarachchi W.A.U.^{1#}, Amarasiri A.M.S.S.¹, Attanayake A.P.²

¹*Department of Medical Laboratory Science, Faculty of Allied Health Sciences, University of Ruhuna, Galle, Sri Lanka*

²*Department of Biochemistry, Faculty of Medicine, University of Ruhuna, Galle, Sri Lanka*

#Corresponding author: udaloka@gmail.com

Background: Chronic kidney disease (CKD) is an emerging global health burden. Precise assessment of the estimated glomerular filtration rate (eGFR) is crucial for the accurate staging of CKD. Different equations have been formulated based on both creatinine and cystatin C values.

Objectives: To correlate eGFR estimated by different equations of creatinine and cystatin in CKD patients on haemodialysis treatment.

Methods: Serum concentrations of creatinine, cystatin C and blood urea nitrogen were measured on 40 pre-dialysis samples received at the chemical pathology laboratory at Teaching Hospital, Karapitiya. eGFR values were calculated using creatinine-based Modification of Diet in Renal Disease (MDRD) and three of Chronic Kidney Disease Epidemiology (CKD-EPI) equations based on creatinine and/or cystatin C values (CKD-EPI_{Cr}, CKD-EPI_{Cys C} and CKD-EPI_{Cr-Cys}). Data were analysed using an independent sample t-test, Pearson's correlation and Bland Altman method using SPSS version 25.0.

Results: Of the participants (n=40), 55% were males. The mean (SD) age of study subjects was 49.6 (\pm 13.9) years. The majority (52.5%) were within the age group 39-59 years. Mean serum concentrations of creatinine, cystatin and blood urea nitrogen of males were 10.39 (\pm 4.51) mg/dL, 6.63 (\pm 1.33) mg/L, 50.37 (\pm 18.3) mg/dL respectively while of females were 8.59 (\pm 3.26) mg/dL, 6.10 (\pm 1.31) mg/L, 40.89 (\pm 16.06) mg/dL respectively. No significant differences in renal function parameters and eGFR values were observed gender-wise or in different age groups ($p > 0.05$). Bland Altman plots revealed certain level of agreement between all selected equations, except for the values derived from CKD-EPI equations based on cystatin C alone and creatinine-cystatin C combination ($p = 0.022$). Person's correlation analysis revealed significant positive correlations between all selected equations of eGFR. The highest correlation was observed between MDRD and CKD-EPI equations based on creatinine values ($r = 0.998$, $p < 0.001$) whereas the lowest correlation was observed between MDRD and CKD-EPI equation based on cystatin C alone ($r = 0.552$, $p < 0.001$).

Conclusions: The present findings suggest, creatinine-based MDRD and CKD-EPI equations in the routine clinical setting to support the management of CKD patients on haemodialysis treatments. The combined equation rather than the CKD-EPI equation based on cystatin C alone, as a confirmatory tool where necessary.

Keywords: Chronic Kidney Disease, Creatinine, Cystatin C, eGFR equations, Haemodialysis