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EVALUATING ALLOGRAFT RENAL FUNCTION BY CYSTATIN C ESTIMATED GLOMERULAR FILTRATION RATE EQUATIONS

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Objectives: Assessing accurate estimation of glomerular filtration rate (GFR) in kidney transplant recipients is indispensable. In Vietnamese clinical settings, we usually evaluate the renal function by estimated glomerular filtration rate (eGFR) based on serum creatinine (Scr) or serum cystatin C (ScysC). We compared equations based on ScysC alone or combined with Scr, with equations based on Scr-based alone to estimate GFR as precisely and simply as possible in kidney transplant recipients.

Methods: 186 kidney transplant recipients with stable kidney function were included in our study. The patients' GFRs were estimated by the Modification of Diet in Renal Disease (MDRD), Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI creatinine 2009), CKD-EPI creatinine-cystatin C 2012, CKD-EPI cystatin C 2012 and 6 other ScysC-based equations (Arnal Dade, Filler-LePage, Hoek, Grubb, Le Bricon, Rule). The ^{99m}Tc-DTPA clearance was considered as the measured GFR (mGFR). We compared the accuracy of the equations to the mGFR.

Results: The mean age of the patients was 42.95±11.2 years. CKD-EPI creatinine-cystatin C 2012 and Hoek equations appeared the least biased (Δ mGFR: 0.64±13.2; 0.13±14.3 ml/min/1.73m², respectively) and had the best correlation with mGFR ($r_1 = 0.734$, $r_2 = 0.736$, ($p < 0.001$)). Also, CKD-EPI creatinine-cystatin C 2012 and Hoek equations had the highest sensitivity (84,8%; 83,8%) and specificity (67,4%; 64,8%) at the cutoff value of 60mL/min/1.73 m² DTPA.

Conclusions: We found that the CKD-EPI creatinine-cystatin C 2012 and Hoek equations had better predictive performance than the others based on Scr or Scys alone to estimate GFR in kidney transplant recipients.

eGFRs based on Scr và ScysC and Δ mGFR in patients after kidney transplantation

Tab. 1 eGFRs based on Scr và ScysC and Δ mGFR in patients after KT

eGFR (mL/min/1,73m ²)	Total (n=186)	Δ mGFR	p
MDRD	68,2±16,7	3,26±15,5	0,006
CKD-EPI crea 2009	72,8±17,1	7,9±15,9	<0,001
CKD-EPI cys-C 2011	69,3±23,1	4,34±16,2	<0,001
CKD-EPI cre cys-C 2012	65,6±18,6	0,64±13,2	0,508
Arnal Dade	57,8±23,5	-7,1±16,4	<0,001
Filler - Lepage	73±24,5	8,1±16,8	<0,001
Grubb	65,2±37,9	0,3±28,5	0,902
Hoek	65,1±20,5	0,13±14,3	0,902
Le Bricon	67,4±18,7	2,5±13,5	0,016
Rule	60,7±21,1	-4,23±14,8	<0,001

Sensitivity and Specificity of eGFRs based on Scr và ScysC

Tab. 2 Sensitivity and Specificity of eGFRs based on Scr và ScysC

eGFRs (mL/min/1,73m ²)	mGFR<60mL/min/1,73m ²		
	Cut off	<u>Sens (%)</u>	Spec (%)
Scr (mg/dL)	1,14	71,2	65,1
ScysC (mg/L)	1,24	84,9	71,7
MDRD	63,73	78,1	66,2
CKD-EPI crea 2009	67,48	78,1	60,6
CKD-EPI cys-C 2011	61,99	81	66,2
CKD-EPI cre cys-C 2012	56,73	84,8	67,4
Arnad Dade	49,91	80	64,2
Filler - Lepage	65,68	78,1	64,8
Grubb	52,28	79	63,3
Hoek	56,86	83,8	64,8
Le Bricon	61,56	80	64,8
Rule	53,39	81	63,4