COMPARISON OF CREATININE BASED eGFR EQUATIONS AS PREDICTORS OF SIGNIFICANT EVENTS IN A COHORT OF CKD PATIENTS

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INTRODUCTION

Glomerular filtration rate (eGFR) is considered the best measure of kidney function. Cockroft-Gault(CG), Modification of Diet in Renal Disease (MDRD) and Chronic Kidney Disease Epidemiology Collaboration Equation (EPI) are the most widespread equations used in clinical practice.
There is a **debate about equations predictive ability for significant events** in patients with chronic kidney disease (CKD).

Our aim was to compare the ability of MDRD, CG and EPI in event prediction: death (D) or renal replacement therapy(RRT).

METHODS

A random cohort of patients followed in our Nephrology ambulatory unit between 1st May and 30th June 2009 was selected.

For each patient eGFR was calculated using MDRD, EPI and CG equations at the baseline and patients were followed until death, RRT or until last appointment.

eGFR → Patients with event (E) / Patients without event (WE)
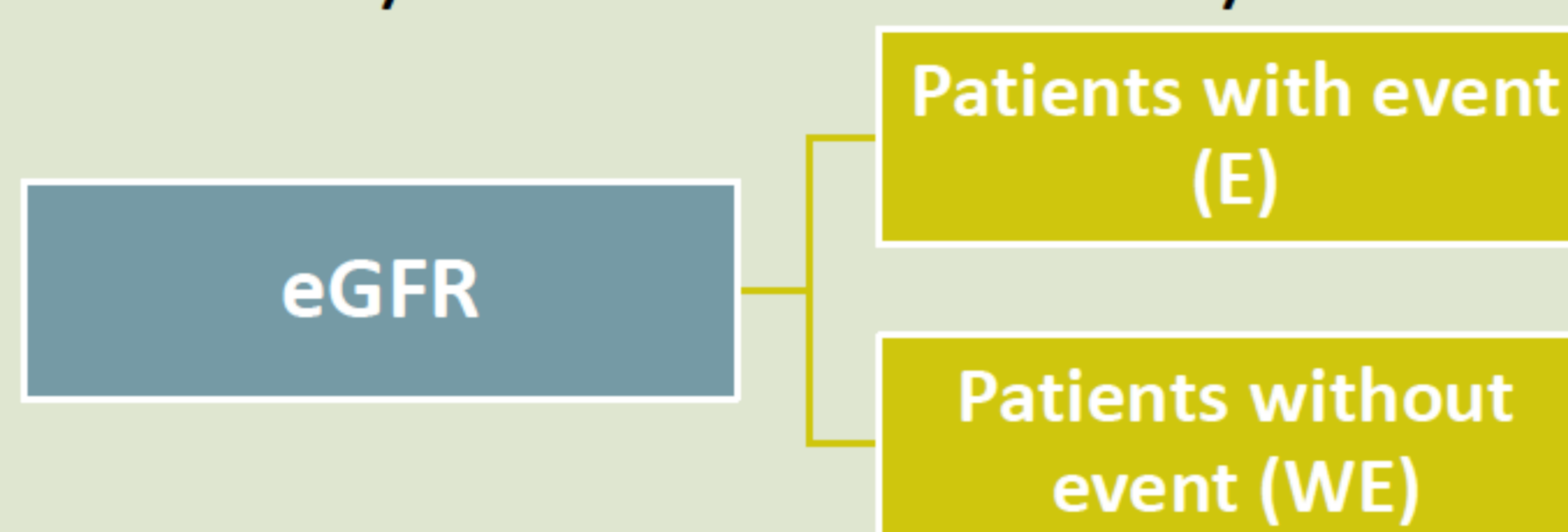
Demographics, cardiovascular risk factors and analytical data were compared between patients (E and WE).

ROC curves analysis were used to **explore prediction ability for the evaluated events** according to each eGFR equation. Patients were divided in 10 percentiles (P10) and reclassification tables were constructed creating three groups: those without reclassification, those reclassified for a higher eGFR percentile by EPI or CG compared to MDRD and those reclassified for a lower eGFR percentile by EPI or CG compared to MDRD.

The 3 groups of patients defined by the reclassification tables were compared by the log-rank test for event occurrence (D or RRT).

Furthermore, patients reclassification status as predictor of event, considering patients without reclassification as reference, was explored by Cox regression adjusted for the following co-variables: sex, diabetes,hypertension, proteinuria (>0,3g/g) and cardiovascular events.

RESULTS

234 patients | **ESRD 20 patients** | **Death 24 patients**

	Total (n=234)	WE (n=187)	E (n=47)	P-v
Age	63.2±18.7	60.9±19.5	**72.1±11.4**	**<0.001**
Female Gender	44.4%	42.2%	53.2%	0.177
CKD Ethiology				0.631
Crohnic GN	20.1%	20.3%	19.1%	
Diabetic Nephropathy	20.5%	18.7%	27.7%	
APKRD	7.7%	18.7%	8.5%	
TIN	12.8%	14.4%	6.4%	
Isquemic	19.7%	19.8%	19.1%	
Unknown	19.2%	19.3%	19.1%	
Diabetes	38%	32.1%%	**61.7%**	**<0.001**
Hypertension	84.6%	82.9%	91.5%	0.144
Dislipidemia	70.5%	69.5%	74.5%	0.506
Hiperuricemia	61.5%	56.1%	**83%**	**<0.001**
Anemia/ ESA use	15.4%	9.1%	**40.4%**	**<0.001**
Cardiovascular disease	26.3%	25.4%	29.8%	0.542
Follow up (months)	**50.6±17.7**	**51.7±17.9**	**46.4±16.5**	**0.057**
Proteinuria>0.3 g/g	46.2%	42.2%	61.7%	0.017
Creat	1.56±0.67	1.44±0.57	**2.07±0.82**	**<0.001**
CysC	1.43±0.65	1.29±0.54	**1.98±0.74**	**<0.001**
eGFR (ml/min/m²)				
MDRD	51.1±42.3	55.4±29.4	**34.2±20.8**	**<0.001**
EPI	52.5±30.4	57.3±30.9	**33.4±19.1**	**<0.001**
CG	61.8±41.5	67.6±41.7	**39.9±32.2**	**<0.001**

Demographical, clinical and analytical variables

ROC for Death (27/210)	AUC	IC 95%	P-v
MDRD	0.657	0.552-0.762	0.008
EPI	0.683	0.585-0.781	<0.001
CG	**0.711**	0.605-0.817	<0.001

ROC for ESRD (20/214)	AUC	IC 95%	P-v
MDRD	**0.824**	0.716-0.933	<0.001
EPI	0.818	0.711-0.926	<0.001
CG	0.790	0.707-0.920	<0.001

	Survival Death-free				Survival RRT-free	
	% at 5 years follow up	Logrank P	HR	CoxP	% at 5 Y follow up	LogrankP
MDRD=EPI (P10) n=179	88,2%	Reference (ref)		Ref	96,0%	Ref
MDRD>EPI (P10) n=28	**58,6%**	**<0,001**	**6,542**	**<0,001**	90,4%	0,642
MDRD<EPI (P10) n=27	100%	0,082		0,997	96,3%	0,930

*Reclassification table - **MDRD vs EPI**, adjusted for sex, diabetes,hypertension, proteinuria (>0,3g/g) and cardiovascular events*

	Survival Death-free				Survival RRT-free	
	% at 5 years follow up	Logrank P	HR	CoxP	% at 5 Y follow up	LogrankP
MDRD=CG (P10) n=88	88,8%	Reference (ref)		Ref	89,1%	Ref
MDRD>CG (P10) n=71	**74,7%**	**0,018**	**2,666**	**<0,035**	94,6%	0,342
MDRD<CG (P10) n=75	91,5%	0,542		0,415	93,1%	0,362

*Reclassification table - **MDRD vs CG**, , adjusted for sex, diabetes,hypertension, proteinuria (>0,3g/g) and cardiovascular events*

CONCLUSIONS

The **prevalence of cardiovascular risk factors** was high. **The events occurred mostly in diabetic** patients. **MDRD was the best predictor of RRT**. CG equation provided a more accurate mortality risk prediction than EPI or MDRD. Our patients characteristics - all caucasians, predominantly old and with a low prevalence of body mass index extremes - may explain these results.