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MP80-12 A SIMPLIFIED EQUATION TO ESTIMATE NEW BASELINE RENAL FUNCTION Cleveland Clinic

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INTRODUCTION

- To date, most predictive models for estimation of new baseline glomerular filtration rate (NB-GFR) after renal surgery for RCC are either complex, require additional studies or lack external validity.
- In this study we develop and externally validate a user-friendly equation to estimate postoperative NB-GFR.

METHODS

- 8080 kidney cancer patients undergoing partial or radical nephrectomy (2005 - 2015) the Veteran's Affair National Health System were identified (RCC-VA cohort).
- NB-GFR was defined as the final GFR value 1 month (>30days) to 12 months (<365 days) postopertively.¹
- All patients had both preoperative and NB-GFR estimations by CKD-EPI.
- Patients with preoperative end-stage renal disease were excluded.
- Multivariable linear regression was used to create an equation to predict NB-GFR using two-thirds of the RCC-VA cohort. The simplest equation with highest coefficient of determination (R²) was selected and tested. Correlation, bias, accuracy and precision was examined.
- The equation was then internally validated the remaining third of the RCC-VA cohort.
- For external validation, a similar cohort of 3514 patients from an outside tertiary care center was used (RCC-CC cohort).

NB-GFR= 32 + preoperative GFR(x0.67) - 18 (if RN) - age (x0.21) - 2 (if diabetes) + 2 (if tumor-size >7cm)

Cohort	RCO	C- VA	RCC-CC
	Development	Internal Validation	External Validatio
lumber of patients	5387	2693	3514
ge (years), median (IQR)	62 (57-67)	62 (57-67)	61 (53-70)
lale, n (%)	5243 (97)	2629 (98)	2301 (66)
ace, n (%)			
Caucasian	4155 (77)	2069 (77)	3049 (87)
African American	1040 (19)	545 (20)	373 (11)
Other	192 (4)	79 (3)	92 (2)
olitary Kidney, n (%)	-	-	222 (6)
MI (kg/m ²), median (IQR)	30 (26-34)	30 (26-34)	30 (26-34)
CI, median (IQR)	1 (0-3)	1 (0-3)	-
iabetes, n (%)	1792 (33)	891 (33)	647 (18)
ypertension, n (%)	3976 (74)	2002 (74)	1742 (50)
ardiovascular disease, n (%)	-	-	595 (17)
reoperative eGFR (ml/min/1.73m ²), median (IQR)	77 (61-93)	77 (61-92)	78 (60-93)
CKD stage I-II (≥60 ml/min/1.73m ²), n (%)	4143 (77)	2064 (77)	2634 (75)
CKD stage III (30 – 59ml/min/1.73m ²), n (%)	1145 (21)	581 (22)	804 (23)
CKD stage IV (15 – 30ml/min/1.73m ²), n (%)	99 (2)	48 (2)	76 (2)
urgical type, n (%)			
Partial Nephrectomy	2131 (40)	1041 (39)	2102 (60)
Radical Nephrectomy	3256 (60)	1652 (61)	1412 (40)
umor size (cm), median (IQR)	4.2 (2.8-6.5)	4.5 (3-6.5)	4.0 (2.5-6.5)
stage, n (%)	(<i>/</i>		()
T1	3719 (69)	1876 (70)	2254 (64)
T2	596 (11)	308 (11)	217 (6)
Т3	1022 (19)	487 (18)	1006 (29)
Τ4	38 (1)	18 (1)	37 (1)
1 stage, n (%)	231 (4)	123 (5)	116 (3)
11 stage. n (%)	240(4)	109(4)	169 (5)
listology. n (%)	- ()		(-)
Clear cell	4381 (81)	2189 (81)	2436 (69)
Papillary	778 (14)	389 (14)	586 (17)
Chromophobe	167 (3%)	82 (3)	223 (6)
Other	61 (1)	33 (1)	269 (8)
ostoperative eGFR (ml/min/1.73m ²), median (IQR)	55 (43-73)	56 (42-72)	60 (44-78)
CKD stage I-II (≥60 ml/min/1.73m ²). n (%)	2298 (43)	1132 (42)	1751 (50)
CKD stage III (30 – 59ml/min/1.73m ²), n (%)	2658 (49)	1359 (50)	1475 (42)
CKD stage IV $(15 - 30 \text{ml/min}/1.73 \text{m}^2)$ n (%)	330 (6)	158 (6)	225 (6)
CKD stage V (<15 ml/min/1 73m ²) n (%)	101 (2)	44 (2)	63 (2)

Table 2. Evaluation of different models to predict NB-GFR

Variable				
	1	2	3	
Preoperative eGFR*	0.76	0.71	0.6	
Radical Nephrectomy		-17.83	-17.4	
Age*			-0.2	
Diabetes				
Tumor Size > 7cm				
Female				
Caucasian				
BMI*				
Hypertension				
Proteinuria				
Model Intercept	1.22	15.22	31.9	
R-squared	0.503	0.653	0.6	
Abbreviations: BMI: body mass index; eGFR: estimated glomerular filtrations * Per unit of variable. Age (in years), BMI (in kg/m ²), preoperative eGFR (is **Model 5 was selected and tested as the final model since the aim was to clinical-logic.				
Table 3. Performance of equation to				
		Inter	nal Va	

	internal va
Correlation (R)*	0.81
Bias (ml/min/1.73m ²)**	-0.77
Accuracy (%)***	81
Precision (IQR)****	15.7 (-8.41 -

Correlation between observed NB-GFR vs predicted NB-GFR

Bias = Median of residuals (observed NB-GFR – predicted NB-GFR) *** Accuracy = percentage of predicted NB-GFR values within 30% of observed NB-GFR

**** Precision = interguartile range of bias

RESULTS

Figure 1. Scatterplot of the correlation among the predicted and observed NB-GFR





underestimations





n ml/min/1.73m²) represent continuous variables minimize model-size without loss of predictive-power or

predict NB-GFR



CONCLUSIONS

- Our analysis provides an equation to accurately predict postoperative new baseline renal function in patients being considered for partial or radical nephrectomy.
- This equation is highly accurate
- It can be easily implemented in daily clinical practice to facilitate and

SOURCES OF FUNDING

Merit Pilot Award #PPO 17-216, VA Grant

DISCLOSURES

1. Lane BR, Demirjian S, Derweesh IH, Takagi T, Zhang Z, Velet L, et al. Survival and Functional Stability in Chronic Kidney Disease Due to Surgical Removal of Nephrons: Importance of the New Baseline Glomerular Filtration Rate. Eur Urol.