P050 Which kidney will benefit more from stone removal? A model to predict significant eGFR improvement after PCNL

EUR Urol Suppl 2019;18(7):e2788

Falagario U.G.[1], Mangiatordi A.[1], Auciello M.[1], Martini A.[2], Bamberger J.[2], Gupta M.[2], Carrieri G.[1], Cormio L.[1]

[1]University of Foggia, Dept. of Urology, Foggia, Italy, [2]Icahn School of Medicine at Mount Sinai, Dept. of Urology, New York, United States of America

Introduction & Objectives: Nephrolithiasis is a common systemic disease associated with both acute kidney injury (AKI) and chronic kidney disease (CKD) The primary mechanism of nephrolithiasis-associated AKI is obstructive nephropathy often associated with rapid deterioration in renal function. Relatively few studies have focused on the recovery of kidney function when the stone has been removed. The aim of this study was to develop a model to predict significant eGFR improvement after PCNL.

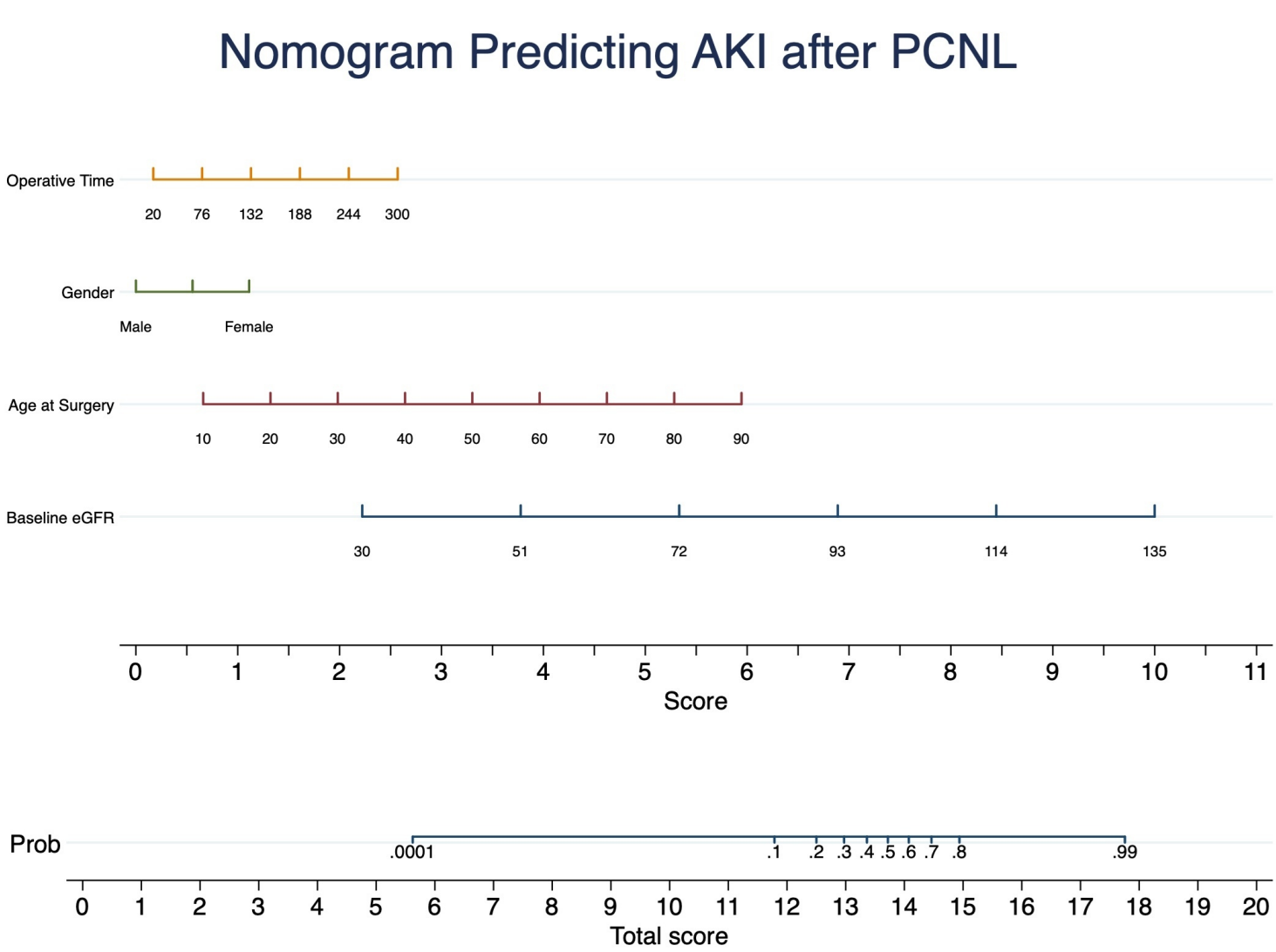
Materials & Methods: Our prospectively maintained Internal Review Board approved PCNL database was queried. Estimated GFR (eGFR) was calculated according to the Chronic Kidney Disease Epidemiology Collaboration formula. Patients with normal eGFR (>90) were excluded. Significant eGFR improvement was defined as >25% increase in preoperative baseline eGFR at discharge from hospital.
Multivariate analysis and ROC curve analysis was used to select the model with the best predictive accuracy which was then used to build a nomogram. Internal validation was performed using the leave-one-out cross validation.

Results: Descriptive characteristics of 494 patients included and multivariate analysis are shown in table 1. Significant eGFR improvement occurred in 102 (20.6%) patients. (Figure 1). A nomogram was built based on a binary logistic regression that ultimately included age, stone shape, stone burden, baseline eGFR, hypertension and BMI. Hypertension although not statistically significant (p 0.2) was included in the model because of its clinical relevance and because it increased predictive characteristics of the model. AUC after internal validation was 81%.

Conclusions: We developed a nomogram that accurately predicts Significant eGFR improvement in patients undergoing PCNL. This model may serve in the preoperative setting to identify patients who would benefit more from immediate intervention.

Table 1				
Covariate	Overall (494)	O.R.	95% C.I.	P>|z|
Baseline eGFR,	73.23 (66.61, 80.26)	0.94	0.92,0.96	<0.001
Age, per y	57.4 (48.4, 66.4)	0.96	0.94,0.98	0.001
Stone Shape				
single*	246 (49.8%)	Ref.		
Multiple	157 (31.8%)	0.43	0.21,0.88	0.021
Staghorn	91 (18.4%)	0.28	0.10,0.77	0.013

Stone Burden, per mm		1.05	1.01,1.08	0.005
Hypertension				
Absent	317 (64.2%)	Ref.		
Present	177 (35.8%)	1.54	0.78,3.03	0.213
BMI, per unit	26.0 (24.9, 30.0)	0.93	0.87,0.99	0.020


Nomogram Predicting AKI after PCNL
Operative Time
20 76 132 188 244 300
Gender
Male Female
Age at Surgery
10 20 30 40 50 60 70 80 90
Baseline eGFR
30 51 72 93 114 135
0 1 2 3 4 5 6 7 8 9 10 11
Score
Prob
.0001 .1 .2 .3 .4 .5 .6 .7 .8 .99
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Total score