P045 A nomogram to predict significant estimated glomerular filtration rate reduction after percutaneous nephrolithotomy

EUR Urol Suppl 2019;18(7):e2780

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

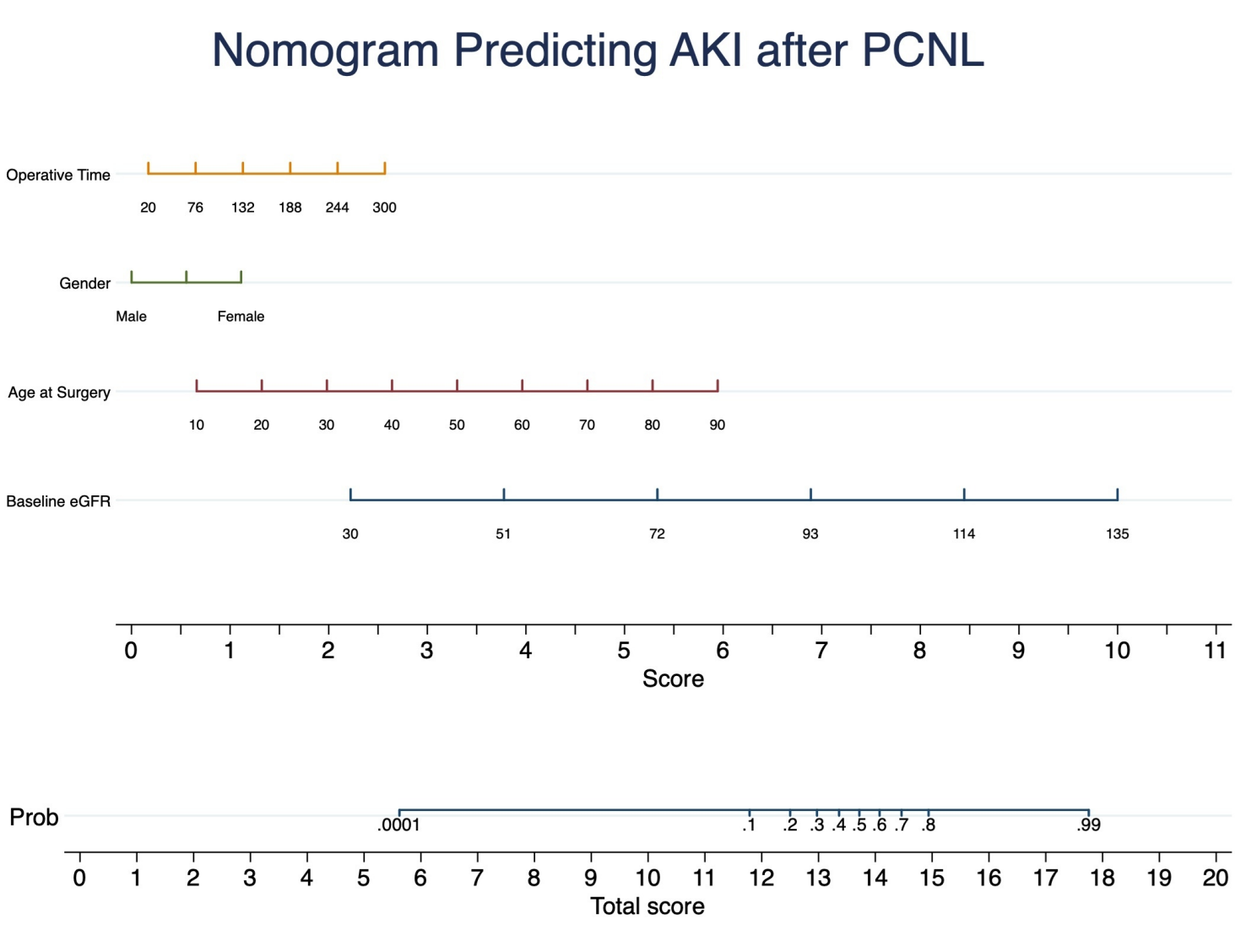
[1]University of Foggia, Dept. of Urology, Foggia, Italy, [2]Icahn School of Medicine at Mount Sinai, Dept. of Urology, New York, United States of America

Introduction & Objectives: Percutaneous nephrolithotomy (PCNL) is a minimally invasive technique to treat large or otherwise complex renal or proximal ureteral stones. Though considered a safe procedure, it may cause acute kidney injury (AKI) due to puncturing and dilating the renal parenchyma as well as to release of bacteria from the stone. Moreover, stone themselves may cause obstructive uropathy. Indeed, the reported rate of AKI after PCNL ranges from 6.7% to 38.2% in different series and may to poor postoperative outcomes and a longer hospital or intensive care unit stay. In the present study, we attempted to develop a nomogram to predict AKI following PCNL.

Materials & Methods: We extract data of 605 patients from our Internal Review Board approved PCNL database. Estimated GFR (eGFR) was calculated according to the Chronic Kidney Disease Epidemiology Collaboration formula. Patients with eGFR<30 were excluded from the analysis. AKI was defined as >25% reduction in preoperative baseline eGFR or >1.5-fold increase in preoperative creatinine, both at discharge from hospital. A nomogram was built based on a binary logistic regression that ultimately included age, sex, baseline eGFR and Operative time. Internal validation was performed using the leave-one-out cross-validation. Calibration was graphically investigated. The decision curve analysis was used to evaluate the net clinical benefit.

Results: Median (IQR) age at surgery was 54.8 (43.8, 63.4) years; 320 (52.9%) patients were female, while 285 (47.1%) were male. Median (IQR) eGFR was 86.3 (71.9, 99.7) ml/min/1.73 m2.
Median (IQR) Operative time was 75.0 (60.0, 100.0) min. Postoperative AKI occurred in 65 (10.7%) patients. All variables fitted in the model significantly ($p<0.01$) predicted AKI and were therefore used to build a nomogram (Figure 1). After internal validation, the AUC was 82%. The model demonstrated excellent calibration and improved clinical risk prediction at the decision curve analysis.

Conclusions: We developed a nomogram that accurately predicts AKI in patients undergoing PCNL. This model may serve in the preoperative setting to counsel patients regarding their risk of suffering AKI as well as in the immediate postoperative period to identify patients who would benefit from an early multidisciplinary evaluation.


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