

## Percutaneous nephrolithotomy in kidneys with impaired renal function: Recoverability assessment using diuretic scintigraphy

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**Introduction & Objectives:** To determine at which limit percutaneous nephrolithotomy (PNL) is valuable in kidneys with impaired function.

**Materials & Methods:** A prospective study was performed for patients undergoing PNL from February 2013 to May 2016. The institutional review board has approved the protocol. Inclusion criteria included stone harboring-kidneys with impaired function defined by the presence of moderate to marked hydronephrosis, parenchymal thinning and/or increased echogenicity. Differential renal function (DRF) was determined using Tc99-MAG3 scintigraphy at baseline and 3-6 months post-operatively. At the same time points, total estimated glomerular filtration rate (eGFR) was measured by the Modification of Diet in Renal Disease (MDRD) equation. Both measures were used to calculate the individual eGFR (i-eGFR) for the PNL-operated kidney. The primary outcome of the study was a deterioration of i-eGFR by  $\geq 15\%$  after PNL. Receiver Operating Characteristic (ROC) curve analysis was performed to determine i-eGFR cut-off value significantly associated with the outcome. Predictors of the outcome were determined using the appropriate statistical tests.

**Results:** In 115 analyzed kidneys, renal function decreased by  $\geq 15\%$  in 57 (49.6%) patients while remained stationary and improved in 49 (42.6%) and 9 (7.8%), respectively. The cohort was divided into two groups based on baseline i-eGFR of  $\leq 15$  ml/min/1.73 m<sup>2</sup> as indicated by ROC curve (AUC: 0.6; P=0.02). In the group with baseline i-eGFR  $\leq 15$  ml/min/1.73 m<sup>2</sup>, 35 (61.4%) kidneys showed post-PNL deterioration compared to 22 (37.9%) with baseline i-eGFR  $> 15$  (P=0.01). Multivariate analysis revealed that lower i-eGFR (odds ratio [OR]: 2.5; 95% confidence interval [CI]: 1.2-6.1; P=0.01) and previous open surgery (OR: 2.7; 95%CI: 1.1-7; P=0.03) were independent predictors of postoperative decline in renal function.

**Conclusions:** PNL performed in kidneys with impaired function  $\leq 15$  ml/min/1.7 m<sup>2</sup> and/or previously operated by open surgery were more likely to experience postoperative renal function deterioration and therefore the benefit of surgery should be weighed against the outcome.