

Assessment of Glomerular Filtration Rate Changes after Percutaneous Nephrolithotomy and Determining the Possible Risk Factors for Postoperative Acute Renal Failure

Introduction and Objective: To investigate the Glomerular Filtration Rate (GFR) changes during and after Percutaneous Nephrolithotomy (PCNL) and determining the possible risk factors for postoperative Acute Renal Failure (ARF).

Materials and Methods: There were 486 patients who underwent PCNL from January 2009 to January 2010 included and their information assessed retrospectively. GFR at six hours, one, two and three days after PCNL and at the discharge day were calculated according to Cockcroft-Gault formula and the changes were compared with preoperative value. Correlation between multiple variables (hemorrhage, diabetic mellitus, uncontrolled hypertension, number of access, stone burden, body mass index and some other variables) and the risk of postoperative ARF were analyzed. Patients with a single kidney were excluded from this study.

Results: Mean preoperative GFR was 87.85 ± 29.41 ml per minute per 1.73 m^2 which decreased to 86.18 ± 28.77 , 78.45 ± 28.74 , 78.79 ± 26.94 , 82.24 ± 29.71 and 82.44 ± 31.82 ml per minute per 1.73 m^2 at 6 hours, one, two, three days and the discharge day post PCNL, respectively. GFR significantly decreased postoperatively at one and two days after surgery (p value < 0.0001 and p value $= 0.0035$) but returned to preoperative values at the discharge day. Among the different possible variables that may be contribute to ARF occurrence after PCNL, only perioperative hemorrhage and hemoglobin drop were significantly concomitant with ARF.

Conclusion: It seems that, compatible with the previous reports, PCNL can be performed with safety and efficacy in patients with large or multiple stones and coexisting medical problems such as diabetes mellitus and hypertension and changes of postoperative GFR return to nearly similar values of preoperative GFR a few days after operation. Important point to decrease the AFR rate after PCNL is avoidance of significant bleeding and hemoglobin drop.