Prediction of Operative and Middle-Term Functional Outcomes after Partial Nephrectomy Using The R.E.N.A.L Nephrometry Score

Introduction and Objectives: We assessed preoperative parameters, including the RENAL nephrometry score (RNS), to predict operative outcomes and middle-term renal function in patients who underwent partial nephrectomy (PN).
Materials and Methods: Between January 2006 and December 2011, 96 patients (98 renal units) who underwent open and laparoscopic PN were enrolled in this study. All procedures were performed with cold ischemia. Two patients underwent two-stage PN for bilateral renal tumors. Preoperative parameters, including age, body mass index (BMI), the American Association of Anesthesiologists (ASA) score, estimated glomerular filtration rate (eGFR), the surgical procedure and the RNS, were assessed. The RNS was categorized into 3 groups, low (sum 4–6), moderate (sum 7–9) and high (sum 10–12). Total ischemic time (TIT), operation time (OT), estimated blood loss (EBL), and perioperative complications were evaluated as operative outcomes. Functional outcome was evaluated in 52 patients with a healthy contralateral kidney for whom we had complete data on the eGFR at least 12 months after the operation.
Results: Open and laparoscopic PN was performed for 41 (41.8%) and 57 (58.2%) renal units, respectively. The RNS was low for 39 (39.6%), moderate in 50 (51.0%) and high in 9 (9.2%). The median TIT, OT and EBL were 40 (0–90) minutes, 195 (119–366) minutes, and 150 (10–2820) ml, respectively. Perioperative complications were observed in 39 (39.8%). The RNS was a significant predictor of TIT and EBL in univariate analysis (P = 0.0002 for each), and TIT in multivariate analysis (RR = 1.314, 95% CI [1.018–1.698], P = 0.0363). In addition, there were significant correlations between the surgical procedure and TIT (P = 0.0189), BMI and EBL (P = 0.0027), as well as the ASA score and the occurrence of perioperative complications (P = 0.0205), in multivariate analysis. Preoperative eGFR was the only significant predictor of middle-term renal function in both univariate and multivariate analyses (P = 0.0321 and 0.0434).
Conclusion: The RNS can predict operative outcome, but not middle-term renal function in patients who undergo partial nephrectomy. Appropriate patient selection for partial nephrectomy and cold ischemia may contribute to a good functional outcome.