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Introduction & Objectives: Robotic-assisted partial nephrectomy (RAPN) has been widely recognized as an alternative treatment for small renal tumors. RAPN is emerging as an effective treatment oncologically and functionally for clinically localized renal tumors. The indications for RAPN have expanded to high complexity tumors. RAPN for high-complexity tumors is, however, still challenging. In this study, the feasibility and perioperative outcomes of RAPN for high-complexity tumors was assessed.

Materials & Methods: The study cohort consisted of 177 cases with clinically localized renal cell carcinoma who had undergone RAPN at our hospital from July 2010 to February 2018. They were assessed for perioperative parameters and trifecta achievement (ie, negative surgical margins, warm ischemia time <25 minutes, and no complications).

Results: Among the 177 cases who had undergone RAPN, 60 had high- complexity tumors, and 117 had non-high-complexity (ie, intermediate- or low- complexity) tumors. There were no significant differences in the operative and console times between the cohorts, but estimated intraoperative blood loss was much lower in the non-high-complexity group. Although the average warm ischemia time was less than 25 minutes in both groups, it was significantly shorter in the non-high-complexity group. Trifecta achievement rates significantly differed between the high- and non-high-complexity groups (68.3% vs 86.3%). Comparisons of four operative parameters (ie, BMI, tumor size, endophytic properties, and hilar tumor) using univariate analysis in the 60 high- complexity tumor cases showed that BMI and tumor size were independent factors ($p=0.05$ and 0.018 , respectively). In multivariate analysis, tumor size was the only factor directly associated with trifecta achievement ($p = 0.029$).

Conclusions: The trifecta achievement rate was significantly lower in the high- complexity group. Only tumor size affected trifecta achievement during RAPN in cases with high-complexity tumors (PADUA score ≥ 10).