



The limits of complex partial nephrectomy: are there any?

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We read with great interest the recent publication by Beksac *et al.* that explored outcomes following robotic partial nephrectomy (RPN) for anatomically complex, defined as R.E.N.A.L. nephrometry score ≥ 10 , cT1-cT2 renal masses (1). The authors aimed to determine the relationship between baseline clinicopathologic characteristics with “trifecta” achievement, defined as warm ischemia time < 25 minutes, lack of perioperative complications, and negative surgical margins (1). Using a multi-institutional dataset, they found that the trifecta was achieved in 62% of patients and that no preoperative baseline, clinical, or tumor characteristics were associated with trifecta achievement. Interestingly, only pathologic tumor stage was significantly associated with achievement of trifecta. This manuscript contributes to the still developing literature for the important topic regarding the role of partial nephrectomy for large and complex renal masses.

First, it should be noted that the overall perioperative outcomes from this cohort are quite impressive, particularly from a purely robotic cohort of anatomically complex partial nephrectomy patients. Beksac *et al.* report overall post-operative and high-grade complication rates of 10.4% and 2.3%, respectively. This highlights the high volume and experience of the authors. A “benchmark” for outcomes of partial nephrectomy can be challenging to identify. In fact, a recent meta-analysis by Mir *et al.* that compared partial nephrectomy versus radical nephrectomy for cT1b and cT2 renal tumors was unable to control for tumor complexity when reporting complications (2). Kopp *et al.* quantified both renal-functional and oncologic outcomes for patients

with cT1b or cT2 tumors in a set of publications, finding overall and high-grade complication rates of 37.5% and 17.5%, which were considerably higher than in this publication by Beksac *et al.* (3,4). Another recent report of complex renal masses with R.E.N.A.L. nephrometry score > 9 by Garisto and colleagues demonstrated overall complication rates of 42% and 28% and major complication rates of 12% and 7% for open and RPN, respectively (5). As the authors themselves state as a limitation, their excellent outcomes for complex renal masses may not be applicable and generalizable to other centers. Furthermore, these results may not be applicable for open partial nephrectomy, which is commonly performed for complex renal masses.

Next, the methodology of this publication has a relatively unique focus compared to prior reports for large or complex renal masses. Rather than initially selecting patients by size or clinical tumor stage cutoffs, this report includes a range of tumor sizes and focuses on tumor complexity as measured by the R.E.N.A.L. nephrometry score. Ultimately, the implied goal of this manuscript is to establish safety and feasibility of partial nephrectomy in this setting relative to radical nephrectomy. The meta-analysis by Mir *et al.* focused on clinical T1b and T2 renal masses, concluding that partial nephrectomy confers comparable morbidity, renal functional, and oncologic outcomes relative to radical nephrectomy (2). The EORTC trial published by Van Poppel *et al.* showed no difference in overall survival between partial nephrectomy and radical nephrectomy for renal cell carcinoma patients, although tumor complexity was not controlled for (6). Importantly, a recent propensity-

score adjusted study by Gershman *et al.* showed that partial nephrectomy ultimately did not result in overall survival benefit compared to radical nephrectomy in patients with cT1 renal cell carcinoma (7). An interesting additional analysis that could aid in this controversy and may be performed utilizing Beksac *et al.*'s database could assess outcomes of all cT1 and cT2 tumors and stratify outcomes by R.E.N.A.L. nephrometry score ≥ 10 . Such an analysis could ultimately allow for further association of R.E.N.A.L. nephrometry score complexity with outcomes, allowing for statistical control of confounding variables.

The choice of achievement of a “trifecta” in this publication warrants mention of several interesting points. First, the definition of trifecta for partial nephrectomy has not been standardized, with varying definitions noted in previously published literature (8,9). While the definition in this publication is relatively commonly utilized, trifecta is generally described to assess the learning curve for minimally invasive partial nephrectomy (10). Several considerations that could improve using trifecta as an outcome would be: (I) to report each constituent of the trifecta separately as an outcome, (II) consider replacement of warm ischemia time <25 minutes with early and late post-operative renal-functional outcomes, and (III) consider replacement of surgical margins with recurrence free survival and cancer-specific survival. Although warm ischemia time <25 minutes and surgical margins have been established as reasonable surrogates for post-operative renal function and oncologic outcomes, in our opinion they are not as ideal as utilizing these outcomes themselves, especially if available within the dataset (11,12).

In summary, determination of the appropriateness of partial nephrectomy for complex renal masses requires data regarding the perioperative, renal functional, and oncologic outcomes of this approach, which this publication contributes data for. The authors demonstrated that in experienced hands, the trifecta of warm ischemia time <25 minutes, lack of perioperative complications, and negative surgical margins could be achieved in 62% of patients, which was noteworthy in their highly anatomically complex renal mass series. However, further studies are needed to accurately predict the achievement of longer-term renal-functional and oncologic outcomes in patients undergoing partial nephrectomy for complex renal masses.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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