



Renal function after kidney surgery: “it’s tough to make predictions, especially about the future”

John M. DiBianco¹, Patrick T. Gomella², Mark W. Ball²

¹Department of Urology, George Washington University Medical School, Washington DC, USA; ²Urologic Oncology Branch, National Cancer Institute, National Institutes of Health, Bethesda, MD, USA

Correspondence to: Mark W. Ball, MD. Urologic Oncology Branch, Center for Cancer Research, National Cancer Institute, Building 10, Room 1-5940, Bethesda, MD 20892, USA. Email: mark.ball@nih.gov.

Provenance: This is an invited article commissioned by the Section Editor Peng Zhang, MD, PhD (Department of Urology, Zhongnan Hospital of Wuhan University, Wuhan, China).

Comment on: Bhindi B, Lohse CM, Schulte PJ, *et al.* Predicting Renal Function Outcomes After Partial and Radical Nephrectomy. *Eur Urol* 2019 ;75:766-72.

Submitted Mar 11, 2019. Accepted for publication Mar 31, 2019.

doi: 10.21037/atm.2019.04.01

View this article at: <http://dx.doi.org/10.21037/atm.2019.04.01>

Partial nephrectomy (PN) is the treatment of choice for the majority of cT1 renal masses (1,2); however, selecting which procedure maximizes benefit and minimizes harm remains a significant clinical challenge. The controversy regarding the decision to perform radical nephrectomy (RN) or PN revolves around the concern for oncologically sound surgery versus optimizing postoperative renal function (2,3). Thus, a focus of research has tried to identify nomograms and protocols to determine the ideal patients for each surgical modality.

Intuitively, it makes sense that the less normal, functional renal parenchyma removed, the higher the post-operative renal functional potential the patient may have. However, the data have been mixed. The only randomized trial comparing PN and RN failed to find an overall survival benefit for patients treated with PN (4). On the other hand, Tan *et al.* demonstrated that among Medicare beneficiaries, patients who underwent PN has improved overall survival as well as improved cancer specific survival (5).

Bhindi *et al.* in their study “Predicting Renal Function Outcomes After Partial and Radical Nephrectomy”, describe their models predicting postoperative estimated glomerular filtration rate (eGFR), derived from over 3,000 patients who underwent either PN or RN (6). Features predictive of eGFR after PN included age, solitary kidney, diabetes, hypertension, preoperative eGFR, proteinuria, surgical approach, time from surgery and several interaction terms. Features predictive of post-operative eGFR after RN

included age, diabetes, preoperative eGFR, preoperative proteinuria, tumor size, and time from surgery. Not surprisingly, preoperative eGFR was one of the strongest predictors of both short-term and long-term renal failure. Thus, their nomogram assists the surgeon in helping to predict the possible renal functional outcome of both PN and RN. This information is helpful in determining surgical approach and counseling patients. However, as a popular saying commonly attributed to Danish physicist Niels Bohr states, “*It’s tough to make predictions, especially about the future*”.

While this manuscript is a valuable contribution to the literature, several points should be considered. As Balachandran *et al.* point out about nomograms “*their performance and limitations need to be appreciated prior to using them in clinical decision making*” (7). In this study, the limitations are few, but important in the generalizability of this nomogram. First, this study took place at a single, high-volume center of excellence. Aside from surgery itself, difference in perioperative care, the use of care pathways, access to and usage of nephrology consultants, etc., may be different in a high-volume academic center and a lower-volume general urology practice. Additionally, the armamentarium of advanced techniques to potentially utilize during PN, including zero ischemia, selective ischemia, early unclamping, among others, is likely more robust among providers who specialize in renal oncology cases. Additional confounders that are difficult to measure

are also likely at play. For example, the decision to perform RN or PN for T2 tumors may be based on multiple patient factors, such as age and comorbidities, as well as tumor factors like size, complexity and tumor location (3,8). However, there may be cases in which patients may take more risk with a more technically difficult surgery in order to optimize postoperative renal function. While the current manuscript may assist in pre-operative planning and counseling, patient factors and surgical procedure may not dictate the whole story.

No current consensus exists regarding ideal surgical technique for PN including margin status or ischemia technique (9-11). Studies arguing for and against several techniques exist and contraindicate each other with regards to complications and outcomes. Individual surgeon however, has been shown to contribute to PN outcome (9). Dagenais *et al.* conducted a study in which >1,400 patients underwent PN by 19 surgeons. Outcomes were found to be related to surgeon after stratifying for patient characteristics (9).

When treating a patient with a renal mass or masses, the decision to perform PN or RN takes into account the risks and benefits of the surgical procedure in conjunction with the short term and long-term complications and outcomes given the patient specific characteristics. It also takes into account the surgeon's expertise. The current manuscript helps to quantify renal outcomes based on the patient characteristics, but, predicting the future continues to be a more complex endeavor.

Acknowledgments

This research was supported (in part) by the Intramural Research Program of the National Cancer Institute, NIH.

Footnote

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

References

1. Ljungberg B, Bensalah K, Canfield S, et al. EAU guidelines on renal cell carcinoma: 2014 update. *Eur Urol* 2015;67:913-24.
2. Campbell S, Uzzo RG, Allaf ME, et al. Renal Mass and Localized Renal Cancer: AUA Guideline. *J Urol* 2017;198:520-9.
3. An JY, Ball MW, Gorin MA, et al. Partial vs Radical Nephrectomy for T1-T2 Renal Masses in the Elderly: Comparison of Complications, Renal Function, and Oncologic Outcomes. *Urology* 2017;100:151-7.
4. Van Poppel H, Da Pozzo L, Albrecht W, et al. A prospective, randomised EORTC intergroup phase 3 study comparing the oncologic outcome of elective nephron-sparing surgery and radical nephrectomy for low-stage renal cell carcinoma. *Eur Urol* 2011;59:543-52.
5. Tan HJ, Norton EC, Ye Z, et al. Long-term survival following partial vs radical nephrectomy among older patients with early-stage kidney cancer. *JAMA* 2012;307:1629-35.
6. Bhindi B, Lohse CM, Schulte PJ, et al. Predicting Renal Function Outcomes After Partial and Radical Nephrectomy. *Eur Urol* 2019 ;75:766-72.
7. Balachandran VP, Gonen M, Smith JJ, et al. Nomograms in oncology: more than meets the eye. *Lancet Oncol* 2015;16:e173-80.
8. Kim SP, Campbell SC, Gill I, et al. Collaborative Review of Risk Benefit Trade-offs Between Partial and Radical Nephrectomy in the Management of Anatomically Complex Renal Masses. *Eur Urol* 2017;72:64-75.
9. Dagenais J, Bertolo R, Garisto J, et al. Variability in Partial Nephrectomy Outcomes: Does Your Surgeon Matter? *Eur Urol* 2019;75:628-34.
10. Minervini A, Ficarra V, Rocco F, et al. Simple enucleation is equivalent to traditional partial nephrectomy for renal cell carcinoma: results of a nonrandomized, retrospective, comparative study. *J Urol* 2011;185:1604-10.
11. Greco F, Autorino R, Altieri V, et al. Ischemia Techniques in Nephron-sparing Surgery: A Systematic Review and Meta-Analysis of Surgical, Oncological, and Functional Outcomes. *Eur Urol* 2019;75:477-91.

Cite this article as: DiBianco JM, Gomella PT, Ball MW. Renal function after kidney surgery: "it's tough to make predictions, especially about the future". *Ann Transl Med* 2019;7(Suppl 3):S82. doi: 10.21037/atm.2019.04.01