



Urologic and interventional radiology treatment of renal cell carcinomas—similarities and differences

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Introduction

Treatment modalities for renal cell carcinoma (RCC) have evolved and broadened as alternatives to traditional nephrectomy. Based on incidence rates in the U.S., the American Cancer Society projects 73,820 new cases of renal cancer in 2019, with 94% of them being RCCs (1). In 2015, the prevalence of RCC in the U.S. was reported to be 505,380 (2).

Alternative treatments for RCC's share the goals of preserving renal function, reducing complications, and improving outcomes. Especially for patients who have severe comorbidities and advanced age, radiofrequency ablation (RFA), being the most established with long-term follow up data and being cost-effective, is appropriate for treating small renal masses (3 cm or smaller) (3-5). RFA approaches can be divided into two categories—percutaneous and laparoscopic, the former being performed more commonly and by interventional radiologists; the latter is typically performed by urologists. In general, retrospective studies on RFA have documented low complication rates and comparable outcomes to open surgery (6,7).

Other treatment alternatives

In addition to RFA, other effective ablative therapies include cryoablation and microwave ablation (MWA). The

purported advantages of cryotherapy include less risk of ureteral stricture, less pain, decreased treatment time, and the ability to use multiple cryoprobes simultaneously (8). Advantages of MWA include greater ablation volumes, no heat-sink effect, and faster ablation times (9). Currently RFA has the most data on patient outcomes, while MWA has the least, due to its more recent introduction.

The current study

No study on small RCCs to date has reported RFA outcomes beyond a 3- to 8-year follow-up. However, Dr. Johnson and colleagues provide valuable input by reporting 10-year follow-up data in their study, *Ten Year Outcomes of Renal Tumor Radio Frequency Ablation*, published in the American Urological Association's (AUA) *Journal of Urology*. The authors reported disease free survival (DFS) percentage of 89% at 6 years for the entire cohort (112 patients), and 81.5% at 10 years for the subgroup cohort who had at least a 10-year follow-up (65 patients) (10). There also were no disease recurrences after 5 years, which echoes the AUA's recommended surveillance time of 5 years (3). The authors reported their results differently, by including both percutaneous and laparoscopic RFA guidance methods in their analysis. Publications on RFA for RCC typically do not include both approaches in the same study.

Laparoscopic versus percutaneous RFA

The vast majority of studies examine the laparoscopic and percutaneous RFA separately (11,12). The current authors cited their own how-to paper that recommends the percutaneous approach for posterior and lateral renal masses, versus the laparoscopic approach for tumors located anteriorly and medially (13). The laparoscopic approach allows direct visualization of exophytic and parenchymal renal tumors, while the percutaneous approach is less invasive and tailored towards outpatient cases, since it is possible to be performed with conscious sedation (14,15).

In addition to anatomical location, a detailed description of the indications and criteria that the authors used to choose one approach over the other would be of interest since standards are not yet established. The authors in this current paper note how the laparoscopic approach has now been largely replaced by the percutaneous approach at their institution (13).

Complications

Albeit uncommon, major complications can occur with all ablation methods. Bleeding and urinary-related complications are the most important. A meta-analysis reported the pooled proportion of complication rate as 19.9% for cryotherapy and 19% for RFA (16). A review on percutaneous ablation of renal masses smaller than 3 cm noted comparable major complication rates between RFA (4.3%) and cryoablation (4.5%) (17). Further data note that the most common complication of percutaneous RFA was renal hemorrhage (1.2%) (18). A previous report from one of the study's authors compared laparoscopic RFA and percutaneous RFA; the study documented that only the laparoscopic approach had major complications—urine leak, lower-pole infarct, and ureteropelvic junction obstruction (19). An inclusion of complication rates could be a potential follow-up study to the current paper since they were not reported.

Nomenclature

Renal masses lay at the intersection of multiple medical specialties, each with their distinctive medical vernacular; one example of this difference in semantics is 'radiofrequency', which typically is written as one word by Interventional Radiologists instead of being split into two,

as seen in the current paper's title (10). One wonders if the three authors included an Interventional Radiologist, ideally the one who performed the percutaneous procedures.

The authors define "local recurrence" as "new contrast enhancement in the area that had been ablated". "New contrast enhancement" can be attributed to various causes: residual and persistent tumor immediately after ablation, tumor appearing delayed in the original ablation zone, inflammatory recruitment, and a new remote lesion. A persistent tumor is one that remains in the immediate ablation zone from inadequate ablation. A recurrent tumor can appear outside of the original ablation zone. New RCCs can occur in either kidney; patients with one RCC are at greater risk for multiple RCCs, as are those patients with hereditary syndromes.

Biopsy

The authors performed biopsies in 74% of their patients (10). The importance of biopsy is obviously to establish a diagnosis, to exclude lesions that do not need ablation, and to provide accurate data with respect to assessing ablation efficiency. The editorial comments at the end of the authors' paper note that biopsies prior to RFA documented 75% of 83 tumors as malignant, which implies that 25% of the biopsies were benign or non-diagnostic. The entity of benign oncocytoma is considered controversial for ablation. Our prior study of 27 patients noted how 10 biopsies of benign renal masses actually had been referred for percutaneous tumor ablation (20). Treatment of benign renal masses may be unnecessary and inappropriately skew data.

Statistics

The authors' study uses univariate statistical analysis. It would also be interesting to see a multivariate analysis like Cox regression, since the effects of multiple factors such as guidance type (laparoscopic versus percutaneous), age, and gender all could be studied simultaneously (10). While the Kaplan-Meier curves in the study are both clinically and statistically significant, not all 112 patients had greater than 10-year follow-up. A subgroup analysis, such as comparing the curves between the greater than 10-year follow-up and the less than 10-year follow-up, would be interesting to study for additional trends.

Technology & expertise

In this study, the RFA procedures were done from 2000 to 2007, almost a decade from today (10). Technology and data collection have progressed in both Urology and Interventional Radiology, so it is important to keep in mind the time period in which this study was conducted. Moving forward, it will be interesting to see if future studies using updated technology and ongoing expertise affect and improve long-term outcomes. As this study is retrospective, prospective studies also would add value to the literature.

Conclusions

The authors are to be commended for their report on actual 10-year durable outcomes for RFA. Their results build even more confidence in the current AUA guidelines for thermal ablation, especially in regard to tumor size and surveillance time (3,7,10). The inclusion of both the laparoscopic and percutaneous approaches encourages further long-term outcome studies to compare the two approaches. As shown in this study, it is reassuring to know that both Urologists and Interventional Radiologists are continuing to work together towards improving the care of patients with RCCs.

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None.

Footnote

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

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