What Is the Contemporary Role of Radiofrequency Ablation in the Management of Small Renal Masses? Are Small Lesions the Radiologist’s Tumors?

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At present, most small renal masses (SRMs) are discovered incidentally in asymptomatic patients and at an early clinical stage. Stage T1 renal tumors (ie, organ-confined and not exceeding 7 cm) account for >60% of cases. A lot of controversies remain regarding the management of SRMs. At the end of 20th century, partial nephrectomy (PN) evolved from a rare procedure to the current standard of care, lessening the risk of chronic kidney disease and (possible) death by other causes in kidney cancer survivors. However, over the last decade, alternative and much less invasive methods (ie, ablative techniques) have been developed and evaluated. Due to the lack of adequate oncologic follow-up and several drawbacks, such as accuracy of pre- and postablation biopsy, the need for frequent imaging, and the high rate of benign pathology in SRM, ablative techniques are currently reserved for patients unfit for surgery.

Nevertheless, an important question arises: What is going to be the standard treatment for SRMs in the future? The improvement of minimally invasive techniques together with an increasing understanding of tumor biology might reduce the role of the conventional surgical approach. Are urologists prepared to become less invasive, broadening their armamentarium of treatment options, or will the management of SRMs become the radiologist’s domain?

The study by Pstutka et al. represents the second study recently published in European Urology on the application of radiofrequency ablation (RFA) in organ-confined kidney tumors [1]. The authors describe their single-institution experience with computed tomography-guided RFA for single, biopsy-proven (T1a and T1b) renal cell carcinoma (RCC). They retrospectively analyze the outcomes of 274 patients with 311 mostly exophytic renal masses with a median size of 3 cm that were treated with RFA.
Long-term (median follow-up: 6.43 yr) oncologic outcome was provided for 185 patients (143 T1a and 42 T1b RCC). Importantly for the population of T1a tumors, follow-up as long as 10 yr was provided. Because the still-limited indications of RFA are linked to restricted follow-up data—in most of the large RFA series, the reported mean follow-up is generally short and does not exceed 3 yr [2]—as well as criticism regarding oncologic safety of the procedure [3,4], this study is of extreme value for the evaluation of this minimally invasive treatment option.

What do we learn from this study? First, RFA was shown to be highly efficient in managing T1a RCC, even at long-term follow-up. In this group, the authors reported a 5- and 10-yr recurrence-free survival (RFS) as high as 96% and 93%, respectively. The 5-yr disease-free survival (DFS) and cancer-specific survival (CSS) were 91% and 100%, respectively. The outcomes of RFA in T1b tumors was less spectacular, with a 5-yr DFS of 74%, suggesting that RFA in tumors >4 cm should be considered only in clinically infirm patients. Similar findings in T1a tumors were reported by Olweny et al. [5].

RFA performed in T1a tumors resulted in 5-yr RFS and DFS of 92% and almost 90%, respectively. Importantly, Olweny and co-workers showed that 5-yr overall survival and CSS were similar for RFA and PN, each >95%.

So do we still lack long-term oncologic efficacy data for RFA in a population with high comorbidities? The answer is no. Can we extend the indication for RFA to young, healthy patients who desire a minimally invasive treatment option? In this case, the answer is more complex. In the study by Psutka et al., no formal competing-risks analysis was performed; instead, Kaplan-Meier analysis was used. As such, they estimated the probability of failure in the absence of competing risks (death from causes other than RCC). This type of analysis may largely underestimate the real risk of DFS. For this reason, cumulative incidence curves should have been used. These allow estimation of the probability of failures observed in patients who are subject to censoring by the competing risk. Moreover, Psutka et al. described a median time to extrarenal metastatic disease of 1.5 yr, median time to recurrence of 2.5 yr, and median time to new renal lesions of 3.3 yr. However, because of insufficient follow-up, a considerable number of patients in their study were censored before they reached these important end points. Again, this might lead to underestimation of the probability to reach these end points. Clearly, we need further prospective—ideally, multi-institutional—studies to pave the way for widespread clinical use of RFA.

Importantly, Psutka et al. have provided median times to reaching hard end points. These should be taken into account in any future study design, as minimum follow-up should exceed these time points. Before a prospective, multicenter trial could be achieved, RFA techniques as well as RFA devices should be standardized. Better definitions of treatment success and failure are also necessary, as the use of radiologic criteria varies between studies and might be inconsistent.

Psutka et al. reasonably point out the value of repeat and salvage RFA. Treatment and/or salvage RFA remain possible following an incomplete or unsuccessful procedure. The ease of retreatment is another advantage of RFA compared with other minimally invasive techniques such as cryotherapy. The authors successfully retreated 24 patients with residual disease, and salvage RFA resulted in a complete response in five of six patients who remained disease free at the subsequent 4-yr follow-up.

Unfortunately, Psutka et al. do not provide a detailed description of their RFA protocol, limiting future comparison across series. How was the RFA procedure monitored? What was the average time of an intervention? What was the minimal temperature achieved during an RFA session? Is it worth using fiberoptic probes [6] to monitor the procedure and to allow equal radiofrequency energy distribution within the lesion? What about the complication rate in T1b tumors? It is hard to imagine that no complications were reported in 42 procedures.

Although probably beyond the scope of the study, the authors did not compare the results of RFA with other treatment options. The paper could have been strengthened if RFA were compared with a matched group undergoing surveillance, PN, or cryoablation. The economic aspects of RFA, which were not mentioned in the paper, are also encouraging. Pandharipande et al. described increased cost effectiveness of RFA compared with nephron-sparing surgery [7]. Hospital stay and overall costs are often reduced, mainly because of quick recovery.

RCC mortality declined in several European countries [8]. Nevertheless, several unanswered questions still prevent new therapeutic modalities from gaining the momentum they need. Do we really understand what is important in SRM management? Have we really made progress in this field? Will it be possible to adequately assess tumor biology? Recently, Thomas and Campbell described a model for the evaluation and management of SRMs [9]. According to their proposed algorithm, in the future—thanks to renal sampling and molecular profiling—more than half of the SRMs (those with nonaggressive characteristics) could be treated with RFA or included in an active surveillance program, sparing patients the inconveniences of surgery. Urologists should remain at the front line of clinical management of SRMs by further elucidating their clinical behavior and validating novel ablative technologies.

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References


