



Which role for renal tumor ablation and which factors can influence long-term oncologic outcomes?

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Due to technological evolution with improved diagnostic accuracy of imaging modalities, it is now possible to accurately diagnose and treat renal cell carcinoma (RCC) from a very early stage, with consequent better prognosis. The introduction of percutaneous ablative procedures, such as radiofrequency ablation (RFA) allowed to provide the least invasive approach, with fewer complications and improved renal preservation, and the quickest recovery available when compared with surgical techniques, widening clinical indications and increasing treatment options.

Partial nephrectomy is still the reference standard for treatment of small renal masses; however, based on 2017 guidelines of the American Urological Association (AUA), thermal ablation can be considered an adequate alternative to surgery in patients with T1a stage tumor (<4 cm), or with an increased risk of multiple RCC tumors (e.g., von Hippel-Lindau syndrome), contraindication to surgical procedure, and solitary kidney (1-3). However, large retrospective studies with long-term oncologic outcomes analysis are still expected (4,5).

In this scenario, the retrospective analysis of long-term oncologic outcomes in 106 patients with a total of 112 renal tumors treated with RFA performed by Johnson *et al.* (1), with a median follow-up of 79 months, could potentially bring ablative therapies to the forefront for treating T1 tumors. In detail, a 6-year overall disease-free survival (DFS) of 89% with a cancer specific survival (CSS) and metastatic free survival (MFS) of 96% were reported, with an overall

survival (OS) of 77%. When considering subgroup analysis, 10-year DFS was 81.5% with MFS and CSS at 94%, with OS of 49%. These good and durable 10-year oncologic outcomes support the AUA guidelines recommendation to consider ablation for the treatment of renal tumor.

Furthermore, based on subgroup analysis, the article confirms that lesion size is the most important factor influencing the treatment choice, representing an independent risk factor for recurrence. In detail, 6-year RFS, MFS, and OS were significantly better for tumors less than 3 cm in size rather than for larger one, with 97% versus 68%, 100% versus 86%, and 84% versus 58%, respectively.

Another factor influencing the treatment choice is tumor location, as also reported in different practical algorithm for procedure planning, such as ABLATE (6), or RENAL nephrometry score (7), which is a standardized classification system for quantifying the anatomic characteristics of renal masses. In detail, the ideal target for an ablative treatment would be a single exophytic cortical lesion, distant from vital local structures, such as bowel loops, ureters, pancreas, adrenal gland, or nerves. In the article, it is only reported that tumors located anteriorly or medially, in close proximity to bowel or adjacent organs, typically were managed by laparoscopic RFA, and tumors oriented more posteriorly and laterally were managed by percutaneous RFA. However, despite the location of the tumor could increase the risk for potential complications

and also could predict treatment response, laparoscopic approach can be avoided with appropriate percutaneous treatment planning and using specific technical maneuvers. For example, intraprocedural blood pressure monitoring and a preablative treatment with an α -receptor blocker could be considered in patients with anteromedial upper pole renal tumors close to the adrenal gland. Furthermore, to avoid damage to the adjacent structures, hydro- and/or pneumo-dissection, pyeloperfusion, through the ureteral stent, nephrostomy catheter, or a Foley catheter can be performed.

It is also mandatory to underline that percutaneous procedures can be performed under conscious sedation, reducing risk for general anesthesia, resulting in a good patient collaboration without significant pain.

Another main point to be discussed is related to the appropriate choice of ablative device and appropriate treatment protocol. Nowadays, there are a number of ablative devices (RFA, microwave ablation, cryoablation, irreversible electroporation) differing each other for needle configurations, with significant differences of treatment protocol, in terms of duration, power applied, and ablation temperature. These technical differences are needed to be well-known by interventional radiologists, as they can affect treatment results, in terms of sizes and shapes of necrotic area. While a prospective study comparing different modalities and treatment protocols is more feasible, many institutions favor one modality over others, making an unbiased comparison extremely complex. The study of Johnson and colleagues seems to reaffirm that the use of RF ablative technologies for lesions less than 3 cm continues to be a safe and effective treatment modality, despite advantages of technologically more advanced, but also more complex and more expensive, devices.

When considering procedural guidance, contrary to what reported by Johnson *et al.* (1), in our experience we usually perform treatment under CT-guidance, which grants the better visualization of the lesion, and US-guidance, which grants a real-time control of the procedure (needle trajectory and placement). This approach allows us to amplify the synergistic effects of both modalities, making the procedure faster, easier, and safer.

We believe that all newly discovered renal solid lesions should undergo percutaneous needle core biopsy if ablation is selected as treatment option, to assess the histological type of RCC. Biopsy could be performed in a separate

session prior to the ablation procedure or during the same session as ablation. We agree with the results obtained by Wells *et al.* (8) demonstrating that renal mass biopsy performed prior to the day of ablation is safe, increasing the rate of histologic diagnosis, avoiding the possibility to treat benign tumors and undetermined small renal masses.

Prospective studies evaluating the ablation of biopsy proven T1 renal cancer could help consolidate more evidence of the oncologic efficacy of thermal ablation therapies.

Future research should also shed light on the interaction and mechanisms governing systemic immunomodulating events and locoregional ablative therapies with the aim to increase the indication for ablation both with a curative as well as palliative indication, combined with systemic options, as treatment intensification for patients with larger lesions or diffuse disease, to improve outcomes.

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Footnote

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

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