

Efficacy and Safety of CT-guided Microwave Ablation in Patients with Localized Small Renal Masses

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Background. CT-guided microwave ablation (MWA) is increasingly used for the treatment of localized small renal masses, especially in patients with co-morbidities that increase the risks of traditional nephrectomy. The main advantages of a percutaneous ablative approach over surgery include less invasiveness and lower reported complication rates. We report patient characteristics and outcomes following MWA of clinically localized small renal masses.

Methods. A retrospective chart review of our institution's biopsy database was conducted to identify all patients with clinically localized renal masses 3 cm or less on abdominal imaging and who underwent a subsequent renal mass biopsy (RMB) and MWA between the years of 2012 and 2022.

Results. 135 patients met inclusion criteria. MWA was technically successful in 98.4% of patients. The majority of patients were male (59.9%) and Caucasian (82.5%). Median (IQR) tumor size was 2.2 cm (0.7,3). The median (IQR) for age and BMI was 70 (38,94) and 30.7 (15.0,52.7), respectively. These parameters for MWA ablation time (minutes) and power (watts) were 10 (1,20) and 65 (65,140), respectively. 36% of lesions biopsied were benign oncocytomas. In those with biopsy-proven clear cell RCC, 4.3% of patients had complications following MWA. Complications requiring readmission, albeit rare, included urosepsis, lung collapse, and retroperitoneal hematoma. Renal function was conserved in all except 2 patients. Local recurrence requiring repeat ablation (4, 2.96%) or surgery (partial nephrectomy (2, 1.48%), radical nephrectomy (5, 3.70%)) was rare. Metastatic-free survival was 95.6% at 24 months for patients who underwent MWA (95% CI 93.4 – 98.7).

Conclusions. In this retrospective review of renal masses 3 cm or less that subsequently underwent RMB and MWA, procedural complication requiring admission or readmission was rare. Complication rates found in this large contemporary study are lower than those reported in previously published data. A majority of research on thermal ablation for renal masses focuses on cryoablation and RFA, and AUA 2021 guidelines on renal mass evaluation and management consider MWA an investigational technique. Nonetheless, MWA has potential advantages of higher ablation volume and shorter ablation time compared to other thermal techniques. MWA for renal masses 3 cm or less should be further investigated as an efficacious and safe option for patients who have co-morbidities that increase the risk of surgical complications.