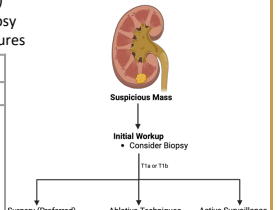
Concurrent Biopsy and Microwave Ablation of Renal Masses: A Better Approach?

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INTRODUCTION

- T1a and T1b renal masses can be effectively treated with percutaneous image-guided microwave ablation (MWA)
- Guidelines (AUA/NCCN) support either:
  - MWA with or without separate biopsy (Bx) as indicated ("MWA alone")
  - concurrent biopsy with ablation ("Bx+MWA")
- Data is lacking to deduce optimal timing of biopsy and effects of combining Bx with MWA procedures

Concurrent Biopsy + MWA	
Pros	Cons
• Efficiency • Reduce procedural risks • Convenience for patient • Timely treatment	• Ablation of benign or indeterminant pathology • Limited risk stratification • Diagnostic ambiguity

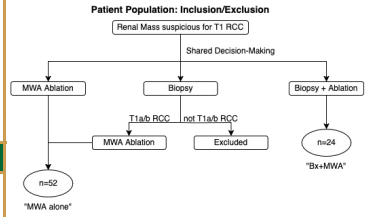


PURPOSE

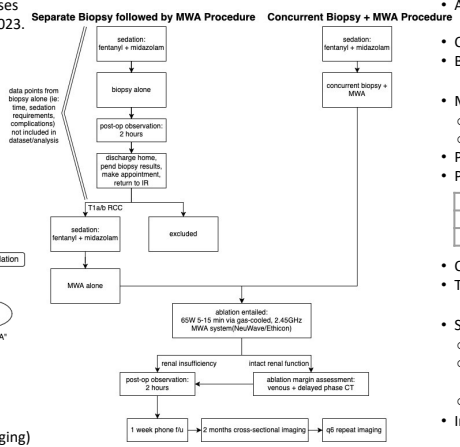
To examine the effects of adding MWA at time of biopsy (Bx+MWA) vs. performing MWA alone on procedural parameters, outcomes, and safety. Specifically, the following parameters were evaluated to compare MWA alone with Bx+MWA: procedure length, sedation requirements, postoperative pain, adverse events, and local tumor recurrence (LTR)

MATERIALS & METHODS

- Retrospective review of all suspicious renal masses (1.0-4.5 cm) that underwent MWA from 2016-2023.
- Included patients with:
  - biopsy proven RCC
    - subsequently treated with MWA
  - lesions clinically suspicious for RCC
    - treated with MWA without biopsy
    - biopsied at time of MWA



- Excluded patients with:
  - metastatic disease
  - inadequate follow-up (<1 year or without imaging)

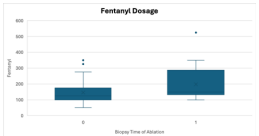


- All MWA and biopsies were performed by fellowship-trained IRs
- Conscious sedation and analgesics administered by IR RNs under MD supervision
- Biopsies performed using a 17g cannula and an 18g cutting needle
- MWAs performed under US and/or CT guidance
  - Hydrodissection utilized as needed
  - Ablation as needed for adequate margins (5-10mm)
- Post-op pain assessed and quantified by self-reported VAS scores
- Patient data collected and analyzed:

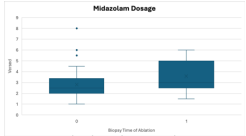
Demographics	Medical History	Tumor Characteristics
Sedation/Analgesic Dosages	Additional Analgesia Required	Post-op Pain Score
Procedure Length (minutes)	Adverse Events	Local Tumor Recurrence

- Charlson Comorbidity Index (CCI) used to compare risk of patients
- Tumor stratification with P-RAC (Percutaneous Renal Ablation Complexity)
- Statistical analysis: performed with SPSS
  - Mann-Whitney U tests was used for procedure length, sedation dosage
  - Chi-squared test of independence was used additional post-op analgesia use, local tumor recurrence and adverse events/outcomes
  - Significance is defined as p-value <0.05
- Institutional Bx-alone (n=11) lacks statistical power, historical comparisons made

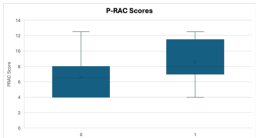
RESULTS



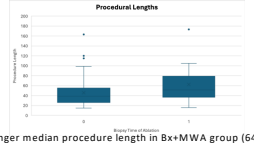
Intraoperative fentanyl administered. Bx+MWA group required higher median fentanyl dosage (198±100 mcg) vs MWA alone (146±60mcg) reflecting increased sedation needs. Outliers in both groups indicate variability in patient responses and procedural demands. Significant: p=0.01



Intraoperative midazolam administered. Bx+MWA group received higher median doses (3.6±1.4mg) vs MWA alone (2.8±1.3mg), suggesting greater sedation requirements for the combined procedure. Outliers in the MWA alone group indicate variability in sedation needs for patients. Significant: p=0.004



P-RAC scores of tumors reflecting complexity. The median PRAC score and variability are higher in the Bx+MWA group (8.9+2.6) vs MWA alone (6.5+2.3 p<0.001). Significant: p<0.001



Longer median procedure length in Bx+MWA group (64±41 minutes) vs MWA alone (46±30 minutes) reflecting the additional time required for concurrent procedures. Outliers in both groups suggest variability in procedure complexity. Significant: p=0.034

Parameter	MWA Alone	Bx+MWA	p-Value	Bx Alone
Number of Cases	52	24	N/A	
Age (years)	68 ± 8.2	71.6 ± 8.6	0.154	
CCI	6.4 ± 2.2	5.7 ± 1.5	0.162	
Ablation Energy (kJ)	33.4 ±11.3	34.2 ± 11.6	0.75	
Pain Medication in Recovery	12%	4.20%	0.3	
Median Follow-up (years)	3.3	2.7	0.14	
Tumor Size (cm)	2.7 ± 0.79	3.34 ± 0.74	0.002	
P-RAC Scores	6.5 ± 2.3	8.9 ± 2.6	<0.001	
Fentanyl Dosage (mcg)	146 ± 60	198 ± 100	0.01	
Midazolam Dosage (mg)	2.8 ± 1.3	3.6 ± 1.4	0.004	
Procedure Time (minutes)	46 ± 30	64 ± 41	0.034	
Adverse Event (AE) Rate	2.00%	4.20%	0.57	
Non-diagnostic biopsies		8.3%		13.9%
Hematoma		4.2%		4.9%
Tumor Seeding		0%		5.7%

Local Tumor Recurrence (LTR)			
Follow-Up	MWA Alone (%)	Bx+MWA (%)	p-Value
1 Year	0	0	N/A
2 Years	1.9	4.2	0.182
3 Years	1.9	4.2	0.182

Comparison of LTR at 1, 2, and 3 years between patients who underwent biopsy with microwave ablation (Bx+MWA) and those who underwent microwave ablation alone (MWA Alone). No significant differences in LTR rates were observed over the 3-year follow-up period.

Mean values of each parameter collected with p-value using Mann-Whitney U and chi-squared test of independence for continuous and categorical data respectively.
Tumor size and P-RAC of Bx+MWA group reflected significantly larger and more complex masses.
Patient age, CCI, follow-up were not significantly different.
No significant difference found between ablation energy used, additional post-op analgesic use, or AE rate.
MWA+Bx may have similar or decreased risk compared to Bx-alone historical rates

CONCLUSION

- MWA of renal masses is highly effective with an excellent safety profile
- Bx+MWA does not compromise safety, effectiveness, or patient experience under moderate sedation with comparable outcomes to MWA alone
- Sedation requirements and procedure time may be mildly increased with Bx+MWA
- No significant impact on postoperative pain, adverse events, or LTR vs MWA-alone
- Comparable clinical outcomes and risk of Bx+MWA and MWA-alone for renal masses
- MWA's thermal effect may mitigate biopsy-related risks

DISCUSSION

- MWA for renal masses is safe and effective for treating suspicious renal masses, either separately or combined with biopsy
- MWA procedures under moderate sedation both provide acceptable clinical results
- Study limitations include: retrospective; small sample size, limited demographic diversity
- Clinical practice bias: Bx+MWA chosen for larger masses/interval growth; separate Bx more likely for patients with poor renal function
- Further studies might include specific biopsy technique/outcomes, sedation methods, risk, procedural logistics/costs comparing separate vs. combined biopsy +/- thermal ablation

REFERENCES