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CAN PREOPERATIVE RENAL MASS BIOPSY REDUCE SURGICAL INTERVENTION?

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INTRODUCTION

Currently, 20-25% of partial nephrectomies performed for small renal cortical masses result in benign pathology. The aim of this study was to assess if implementation of a routine renal mass biopsy (RMB) altered the treatment and/or management decisions of patients with cT1a or cT1b renal masses.

METHODS

- We analyzed a multi-institutional, prospectively maintained database of 91 patients who underwent an office-based, ultrasound-guided RMB from May 2013 to August 2018.
- A retrospective frequency-matched cohort of 107 patients who did not undergo RMB served as a control over this same time period.
- The two groups were matched based on age, body mass index (BMI), Charlson Comorbidity Index (CCI), R.E.N.A.L. Nephrometry Score, and tumor size.

RESULTS

Table 1. Surgical Pathology for cT1a Renal Masses

	Clinical Stage T1a		
Pathology*	**Control**	**Biopsy**	**p**
Total Benign	16 (27%)	1 (2%)	<0.001
Total Malignant	43 (73%)	39 (98%)	<0.001

- For tumors with benign pathology:
  - 0% were AMLs in either group
  - 12% were oncocytomas for control vs. 3% for biopsied cases
- For tumors with malignant (RCC) pathology:
  - 56% were clear cell subtype for control vs. 85% for biopsied cases
  - 7% were papillary subtype for control vs. 10% for biopsied cases
  - 3% were chromophobe subtype for both control and biopsied cases
  - 73% were low Fuhrman grade (1/2) for control vs. 66% for biopsied cases

Table 2. Surgical Pathology for cT1b Renal Masses

	Clinical Stage T1b		
Pathology*	**Control**	**Biopsy**	**p**
Total Benign	2 (7%)	1 (5%)	0.4238
Total Malignant	25 (93%)	6 (86%)	0.4238

- For tumors with benign pathology:
  - 0% were AMLs in either group
  - 12% were oncocytomas for control vs. 3% for biopsied cases
- For tumors with malignant (RCC) pathology:
  - 56% were clear cell subtype for control vs. 85% for biopsied cases
  - 7% were papillary subtype for control vs. 10% for biopsied cases
  - 3% were chromophobe subtype for both control and biopsied cases
  - 73% were low Fuhrman grade (1/2) for control vs. 66% for biopsied cases

*Histology is based on surgical pathology; surgical pathology was available for 47 (52%) biopsy patients and 86 (80%) control patients.

Table 3. Treatment Modalities for T1a Renal Masses

	Clinical Stage T1a		
Treatment	**Control**	**Biopsy**	**p**
Active Surveillance	10 (13%)	25 (35%)	<0.001
Embolization	0 (0%)	0 (0%)	
Cryoablation	32 (44%)	5 (7%)	
Partial or Radical Nephrectomy	31 (43%)	39 (54%)	
Other	0 (0%)	3 (4%)	
Total	**73 (100%)**	**72 (100%)**	

Table 4. Treatment Modalities for T1b Renal Masses

	Clinical Stage T1b		
Treatment	**Control**	**Biopsy**	**p**
Active Surveillance	3 (10%)	6 (33%)	<0.001
Embolization	1 (3%)	1 (6%)	
Cryoablation	0 (0%)	0 (0%)	
Partial or Radical Nephrectomy	27 (87%)	8 (44%)	
Other	0 (0%)	3 (17%)	
Total	**31 (100%)**	**18 (100%)**	

- Among our 91 RMB patients, 72 had a T1a renal mass while 19 had a T1b renal mass
- Among our 107 control patients, 73 had a T1a renal mass while 34 had a T1b renal mass
- The overall RMB diagnostic rate was 80%.
- Surgical pathology revealed that the excision of benign tumors was **five-fold less** in the RMB cohort compared to the control group (4% vs. 21%; p=0.006).
- The rate of active surveillance in the RMB cohort was almost **three times higher** at 35% vs. 13% for the controls (p<0.001).
- Biopsy pathologies were concordant with surgical pathologies in 95% of cases when examining a renal mass' primary histology (benign vs. malignant), 97% for histologic subtype, and 78% for low (I or II) vs. high (III or IV) Fuhrman grade.
- Multivariate analysis showed that patients who underwent surgical intervention without preoperative RMB were **14.5 times more likely** to have benign histopathology compared to patients who underwent preoperative RMB (OR 14.5, 95% CI=3.9-65.7).

CONCLUSIONS

- **For cT1a lesions, office-based renal mass biopsy led to a five-fold significant decrease in the rate of surgical intervention for benign tumors.**
- **For cT1b lesions, office-based renal mass biopsy led to no significant change in the rate of malignant pathology.**

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