



COMPLICATIONS FOLLOWING 1155 PERCUTANEOUS CORE RENAL MASS BIOPSIES: RISK FACTORS AND SAFETY ASSESSMENT

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Background

- Percutaneous renal mass biopsy (RMB) is an important tool in the management of renal cell cancer, which can be used for risk stratification and treatment planning.
- High sensitivity and specificity for identification of renal cancer. Non-diagnostic rate remains ~15-22%.
- Reported complication rates of RMB are low but risk factors for an adverse event have not been identified.

Objective

- To evaluate patient, tumor, and technical factors associated with procedural complications after RMB.

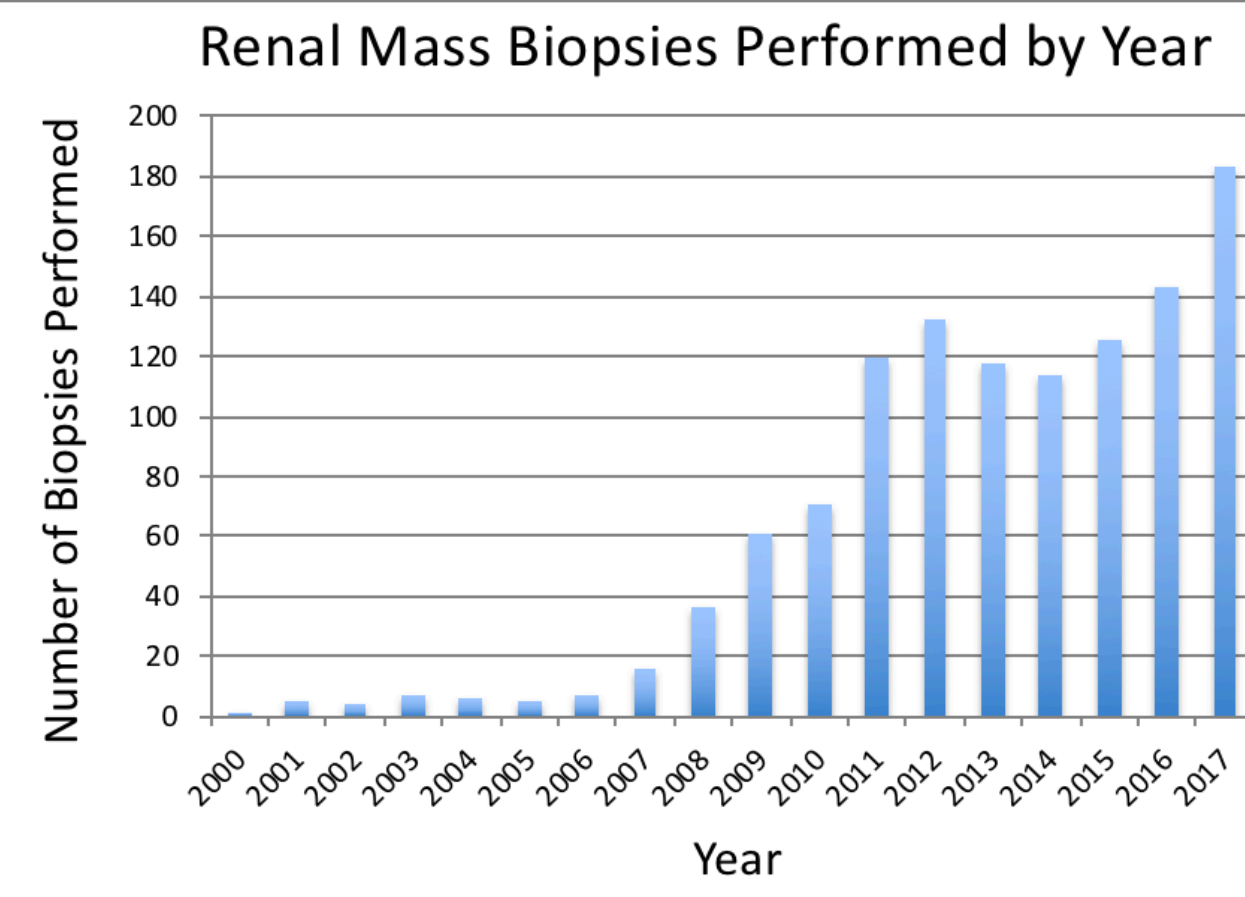
Methods

- 1155 consecutive patients undergoing percutaneous core RMB from 2000-2017 were identified. Patients routinely called 2 days after procedure to assess complications.
- *Institutional guidelines for RMB:*
 - May proceed if INR ≤ 2.0, platelets > 25,000, and continuation of aspirin (ASA) therapy.
 - Biopsies performed by fellowship-trained radiologists with or without a trainee.
- Medical records, biopsy procedure notes and imaging studies were reviewed to identify patient, tumor and technical factors.
- Primary outcome: Major and minor complications within 30 days of procedure. Secondary outcome: Non-diagnostic (ND) rate.

Results

Complications

- 24 (2.2%) patients had any complication identified with 30 days
- Major complications (≥Clavien 3a) were identified in 5 patients (0.4%) patients:
 - 1 pseudoaneurysm
 - 1 acute bleed with hypotension
 - 3 sepsis from urinary source
- Hospital admission in 11 patients (1.0%)
- No cases of tumor seeding identified.



Variation in complications and ND rates among radiologists performing RMB (with minimum of 50).

Radiologist	1	2	3	4	5	6	7	8	9	10	11	12
No. of biopsies performed	62	68	68	72	75	84	91	95	98	111	122	138
Avg. no. of biopsy cores obtained	2.7	2.0	2.4	2.4	2.4	2.8	2.1	2.3	2.3	2.8	2.5	3.1
Overall Complication rate (%)	1.6	2.9	2.9	1.4	1.3	3.6	1.1	0	2.0	2.7	0.8	2.2
Major Complication Rate (%)	1.6	0	0	0	0	1.2	0	0	0	0.9	0.8	0
ND rate (%)	10.7	14.5	16.4	14.9	23.9	13.9	14.5	13.8	10.3	15.2	15.0	13.5
ND rate, SRMs (%)	8.3	11.9	20.9	16.0	27.5	19.2	15.4	17.8	12.5	18.8	15.6	17.5

Multivariate logistic regression analysis for factors associated with non-diagnostic rate.

	Odds Ratio	CI	P value
Cystic lesion (vs. Solid)	5.32	3.34-8.51	0.0
Enhancing (>20 HU, >15% on MR)	0.33	0.17-0.66	0.002
Skin to tumor distance	1.10	1.00-1.20	0.05
Diameter of Renal Mass	0.91	0.84-0.98	0.02
Radiologist Experience	1.00	0.99-1.00	0.33

Factors Associated with Complications

Variable	No complications N=1131	Complications N=24	P-Value
Age, median (IQR)	65.6 (58.0-72.2)	66.4 (53.8-70.1)	0.54
BMI, median (IQR)	29.7 (26.0-34.8)	31.5 (26.6-36.8)	0.35
Gender			0.06
Male	737 (98.5%)	11 (1.5%)	
Female	394 (96.8%)	13 (3.2%)	
Post ablation	92 (98.9%)	1 (1.1%)	0.72
Size of renal mass, median (IQR)	3 (2.1-5)	3.8 (2-7.1)	0.46
Year of biopsy			0.35
< 2009	149 (99.3%)	1 (0.7%)	
2010-2017	982 (97.7%)	23 (2.3%)	
Size of biopsy needle			1.000
<20	1014 (97.7%)	24 (2.3%)	
20	40 (100%)	0 (0%)	
>20	17 (100%)	0 (0%)	
Number Cores			0.20
1	234 (98.7%)	3 (1.3%)	
2	403 (98.5%)	6 (1.5%)	
>2	486 (97.0%)	14 (3.0%)	
CT or US guided			0.16
CT	105 (100%)	0 (0%)	
US	1022 (97.7%)	24 (2.3%)	
On ASA	435 (98.6%)	6 (1.4%)	0.21
Blood thinner use	230 (97.5%)	6 (2.6%)	0.62
Platelets <160,000	175 (99.4%)	1 (0.6%)	0.16
INR >1.2	55 (96.5%)	2 (3.5%)	0.35
Hemoglobin, median (IQR)	13.2 (11.6-14.5)	12.5 (10.6-14.2)	0.40
Creatinine, median (IQR)	1 (0.83-1.24)	1 (0.8-1.55)	0.75
CCI, median (IQR)	1 (0-2)	0 (0-2.5)	0.18
Trainee Present	945 (98.2%)	17 (1.8%)	0.10
Median SBP (IQR)	132 (121-145)	139 (124-150)	0.36
Median DBP (IQR)	74 (66-82)	77 (68-84)	0.51
Current smoker	151 (98.7%)	2 (1.3%)	0.76
Prior bleeding disorder	14 (100%)	0 (0%)	1.000
Cancer diagnosed	731 (98.1%)	14 (1.9%)	0.36
Nephrometry score	7 (5-9)	8 (6-10)	0.24
First 25 cases**	298 (99.3%)	2 (0.7%)	0.05
First 50 cases**	590 (98.3%)	10 (1.7%)	0.39

**For top 12 radiologists only.

Conclusions

- Low overall and major complication rates, 2.2% and 0.4%.
- No patient, tumor or technical factor evaluated was predictive of complications.
 - No difference in patients who remained on ASA, platelet >25,000 but < LLN, or INR 1.2-2.
- Non-diagnostic biopsy was more likely in cystic masses, hypo-enhancing with larger skin-to-tumor distance and smaller diameter.