

## Introduction

- Estimated 64,000 new cases of Renal Cell Carcinoma(RCC) and 14,000 attributable deaths<sup>1</sup>.
- Treatment of RCC may be partial nephrectomy (PN) or radical nephrectomy (RN)
- Intrabdominal RCC recurrence is as high as 16%<sup>2-3</sup>
- AUA and NCCN RCC surveillance guidelines lack strong evidence and have been shown to miss up to 33% of recurrences<sup>4</sup>.
- Detection and resection of solitary metastasis have been shown to improve survival outcomes<sup>5</sup>
- Despite inferiority in detection of small renal and adrenal tumors, lymph node, bone, and retroperitoneal invasion US is still recommended in surveillance<sup>6,7</sup>.
- Hypothesis: The utility of US in RCC surveillance after nephrectomy is inferior to CT/MRI.

## Methods

- Retrospective analysis of 800 patients undergoing RN(n=404) and PN(n=396) for RCC at the KUMC between 2008 and 2016.
- All recurrences were confirmed with CT/MRI and then later with tissue biopsy (gold standard)
- Comparisons between “abdominal recurrence” and “no abdominal recurrence” using 2-sample t-tests for interval date and Fisher’s exact tests for categorical data

## Results

**Table 1:** Patient characteristics by presence of intra-abdominal recurrence

|                             | All patients<br>(n = 800) | Abdominal<br>recurrence<br>(n = 149) | No abdominal<br>recurrence<br>(n = 651) | p value |
|-----------------------------|---------------------------|--------------------------------------|---|---------|
| Age (years) (mean ± SD)     | 59.1 ± 12.7               | 59.1 ± 12.9                          | 59.0 ± 12.6                             | 1.000   |
| Surgical technique (%)      |                           |                                      |   | < .0001 |
| Radical nephrectomy         | 396                       | 92 (62)                              | 268 (41)                                |         |
| Partial nephrectomy         | 404                       | 57 (38)                              | 383 (59)                                |         |
| Surgical approach (%)       |                           |                                      |   | < .0001 |
| Open                        | 339 (42)                  | 99 (66)                              | 240 (34)                                |         |
| Laparoscopic/Robotic        | 461 (58)                  | 50 (34)                              | 411 (66)                                |         |
| Tumor size (cm) (mean ± SD) | 5.1 ± 3.7                 | 7.0 ± 4.6                            | 4.5 ± 3.1                               | < .0001 |
| Tumor stage (%)             |                           |                                      |   | < .0001 |
| T1                          | 582 (73)                  | 76 (51)                              | 506 (78)                                |         |
| T2                          | 127 (16)                  | 41 (28)                              | 86 (13)                                 |         |
| T3                          | 87 (10)                   | 29 (19)                              | 58 (9)                                  |         |
| T4                          | 4 (0.5)                   | 3 (2)                                | 1 (0.1)                                 |         |
| Nuclear grade (%)           |                           |                                      |   | < .0001 |
| 1-2                         | 612 (77)                  | 91 (61)                              | 521 (80)                                |         |
| 3-4                         | 188 (23)                  | 58 (39)                              | 130 (20)                                |         |

**Table 2:** Intra-abdominal recurrences broken down by site in (i) entire cohort, (ii) radical nephrectomy and (iii) partial nephrectomy cohorts

|                                  | Total<br>(n = 149) | Radical Nephrectomy<br>(n = 92) | Partial Nephrectomy<br>(n = 57) |
|----------------------------------|--------------------|---------------------------------|---------------------------------|
| Bone (%)                         | 21 (14)            | 17 (19)                         | 4 (7)                           |
| Liver (%)                        | 16 (11)            | 11 (12)                         | 5 (9)                           |
| Renal fossa (%)                  | 31 (21)            | 31 (34)                         | --                              |
| Tumor bed/ipsilateral kidney (%) | 35 (19)            | --                              | 35 (61)                         |
| Retroperitoneal lymph nodes (%)  | 39 (26)            | 27 (29)                         | 12 (21)                         |
| Peritoneum/omentum (%)           | 3 (2)              | 3 (3)                           | 0                               |
| Adrenal gland (%)                | 4 (3)              | 3 (3)                           | 1 (2)                           |

## Summary

- Of the 800 patients, 149 (19%) had abdominal recurrences
- Of the 149 recurrences, only 8 (19%) were initially detected by US and 15 (10%) recurrences were missed by a prior negative US.
- 8 false-positive US studies

## Conclusion

- Low utility of US identification of intrabdominal recurrence 2% (RN) and 10%(PN)
- US detected only 6(0.7%) recurrences compared to CT/MRI detection of 51(8.4%)
- Location of RCC recurrences is outside of scope of US
- US would have missed at least 34% (RN) and 61%(PN) based upon location alone.
- Surveillance guidelines should question the inclusion of US

## Limitations and Future Studies

- Retrospective design
- Changing guidelines during study
- Lack of direct comparison of imaging modalities preventing the calculation of sensitivity, specificity, negative and positive predictive value and positive
- Future prospective trial to determine the efficacy of US in comparison to CT/MRI

## References

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