NYU Langone Health

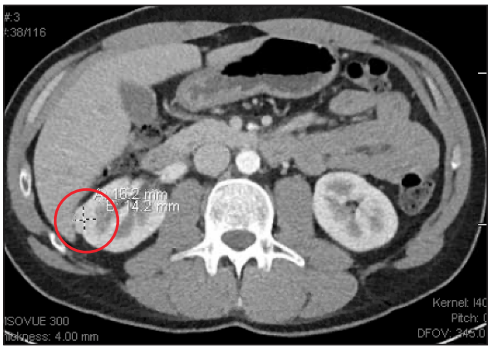
Department of Urology
Case of the Month

Challenges in the Contemporary Management of Small Kidney Masses

CASE 1 PRESENTATION

Healthy 39-year-old man with a 2.2 cm enhancing solid renal mass noted on CT scan performed for abdominal pain.

Figure 1. CT scan showing an enhancing solid right renal mass.



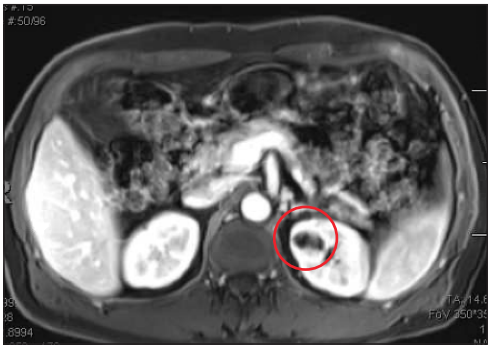
Management: Robotic partial nephrectomy.

Pathology: Kidney tumor 1, right; partial nephrectomy: oncocytoma (2.1 cm).
Note: The tumor showed diffuse reactivity for CD117 and scattered positivity for CK7, supporting the histologic diagnosis of oncocytoma.

CASE 2 PRESENTATION

Healthy 54-year-old man with an incidental 2.5 cm complex cyst noted on chest CT scan prompting a renal MRI, which confirmed a 2.6 cm cystic left upper pole renal lesion containing a thick peripheral rim and enhancing internal septations, suspicious for cystic renal cell carcinoma (Bosniak category III).

Figure 2. MRI showing a left upper pole renal cyst.



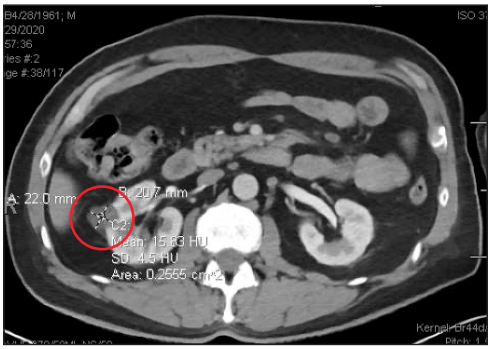
Management: Robotic partial nephrectomy.

Pathology: Benign multilocular renal cyst.
Note: Multiple deeper levels were examined. No evidence of malignancy was identified.

CASE 3 PRESENTATION

59-year-old man with a history coronary artery disease, severe aortic regurgitation, a cerebrovascular accident, and a thoracic aortic aneurysm repair, referred by his primary urologist for treatment of a biopsy-proven enlarging solid 2.2 cm papillary renal cell carcinoma.

Figure 3. CT scan demonstrating biopsy-proven right renal cell carcinoma



Management: Active surveillance; 5 months after he was placed on surveillance by GU, patient died following complications from a valve replacement.

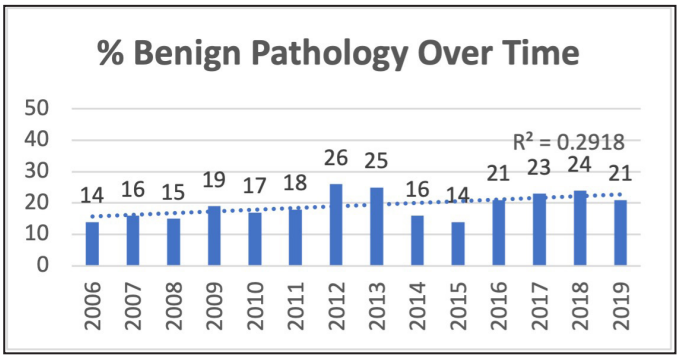
COMMENT

With widespread liberal use of diagnostic imaging, incidental small renal masses (SRMs) account for nearly 70% of all new diagnosed kidney tumors. The management of SRMs has dramatically evolved over the past decade and a half. Radical nephrectomy is no longer universally employed as the treatment of choice for SRMs and patients are now treated with a variety of kidney-sparing options, including partial nephrectomy and ablation. The management of SRMs has also evolved to include active surveillance or observation because of an improved understanding of the heterogeneity of SRMs and the indolent natural history associated with even malignant SRMs.[1]

Over this period, advances in imaging have led not only to earlier detection of SRMs but also to an improved ability to identify benign renal masses, such as lipid-poor angiomyolipomas (AMLs) and benign complex renal cysts. Despite these diagnostic and therapeutic advances, these 3 unique SRMs cases demonstrate ongoing challenges in the management of SRMs.

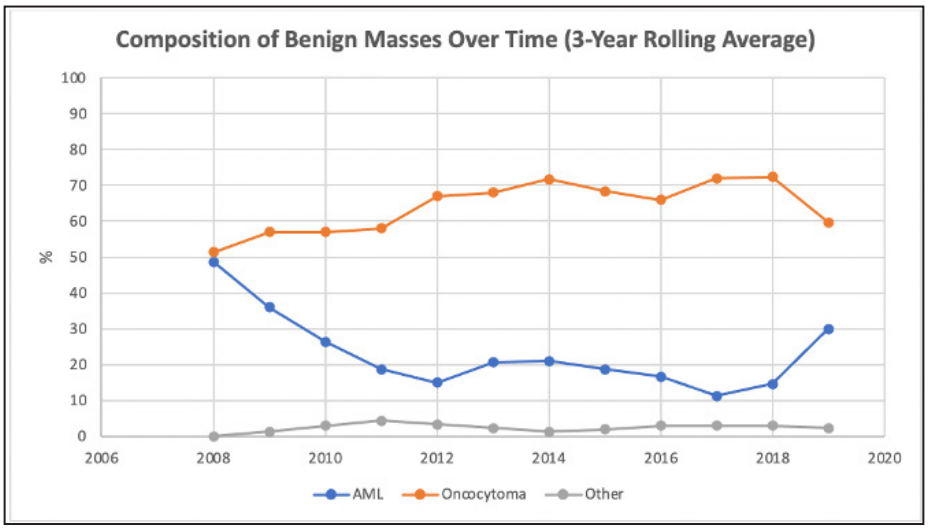
It has been reported historically that up to 20% of small renal masses are benign.[2] With adoption of renal mass biopsy, increased use of observation/surveillance, and improved imaging, it would be reasonable to assume that the number of benign renal masses undergoing surgical resection would decline over time. Interestingly, in a recent review of NYU Langone Urology's prospectively maintained database of more than 1,800 patients undergoing partial or radical nephrectomy, the incidence of benign masses remains roughly 20% and includes lipid-poor AMLs, oncocytomas, and other benign solid renal masses (Figure 4).[3]

Figure 4. Renal masses: percentage of benign pathology over time.



Over this same period, however, the incidence of oncocytoma appeared to increase (from 51% to 59%) while the incidence of AMLs decreased (from 49% to 30%) (Figure 5).

Figure 5. Percentage of benign masses, by type of mass, over time (3-year rolling average).

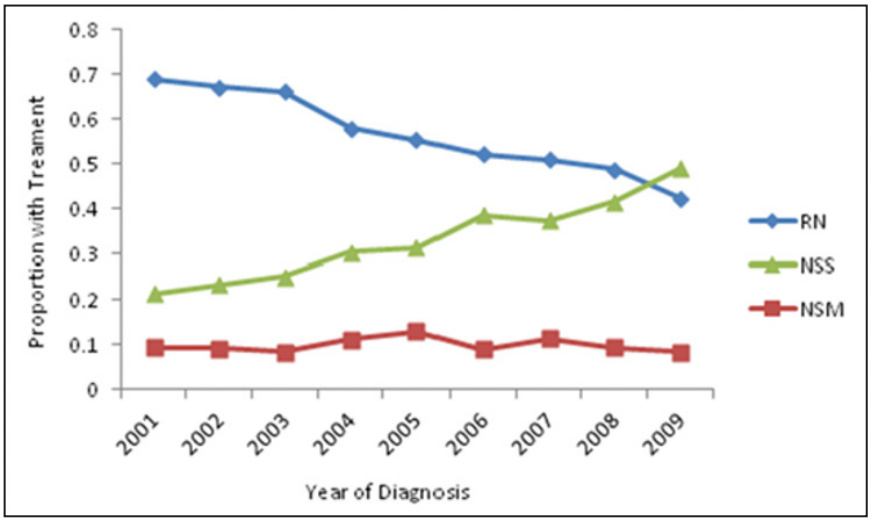


Oncocytomas continue to present as a diagnostic challenge in patients with SRMs. On both imaging and percutaneous biopsy, these tumors have overlapping features with malignant renal masses, making it difficult to preoperatively differentiate them from malignant tumors. On contrast-enhanced CT or MRI, oncocytomas share imaging characteristics with clear cell renal carcinomas.[4] In order to overcome the limitations of CT and MRI in identifying oncocytomas, there has been a growing interest in both percutaneous renal mass biopsy and nuclear medicine imaging studies such as 99mTc-sestamibi SPECT/CT, which have been shown to differentiate oncocytomas from malignant renal masses with high sensitivity and specificity.[5] Although both sestamibi SPECT/CT and renal mass biopsy can differentiate oncocytomas from clear cell and papillary renal cell carcinomas, there are challenges in differentiating oncocytomas from malignant oncocytic tumors such as chromophobe renal cell carcinomas and hybrid oncocytic tumors, which arguably have malignant potential.[6]

In addition to ongoing diagnostic challenges, treatment selection remains a challenge for many patients with SRMs, particularly older patients or patients with significant comorbid conditions, who are unlikely to benefit from any treatment. Given the low likelihood of disease progression in malignant SRMs, multiple guidelines offer treatment recommendations based on life expectancy and the risk of treatment-related complications and adverse effects such as chronic kidney disease. Although this tailored treatment approach is used in other indolent genitourinary malignancies such as low-risk prostate cancer, there is a paucity of high-level data supporting an optimal treatment approach with SRMs, resulting in a large degree of uncertainty about the most effective, risk-based criteria for treatment.

Currently, the majority of patients with a SRM undergo active treatment. Despite exceedingly low rates of disease progression (<5%) among SRMS including Bosniak III and IV complex cysts, most patients undergo treatment, due to the inability to accurately identify those cancers which will progress. Evaluation of contemporary practice patterns suggests up to 90% of patients with SRMs undergo treatment, with active surveillance or observation being underutilized (Figure 6).[1]

Figure 6. Proportion of patients with SRMs undergoing treatment, by treatment. NSM, nonsurgical management; NSS, nephron-sparing surgery; RN, radical nephrectomy.



In the future, novel tests (tissue biomarkers and imaging studies) will allow us to accurately identify the few tumors that are aggressive and require treatment. In the meantime, we must educate patients and their providers (jamanetwork.com/journals/jama/fullarticle/2747673) about the very low oncologic risk attributable to SRMs, allowing them to make informed and personalized risk-based treatment selections.[7,8]

REFERENCES

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William Huang, MD, is a fellowship-trained urologic oncologist at NYU Langone Health and the Perlmutter Cancer Institute. He is associate professor of urology and vice chair for Clinical Affairs in the Department of Urology at NYU Grossman School of Medicine. Dr. Huang is also chief of the Urology Service at Tisch Hospital and co-director of the Robotic Surgery Center at NYU Langone Health. Dr. Huang has extensive experience in open, robotic, and laparoscopic surgical techniques and has performed more than 1,200 robotic surgeries. His surgical expertise includes the treatment of complex kidney, retroperitoneal, and testicular tumors, along with minimally invasive radical cystectomy, partial and radical nephrectomy (including inferior vena cana thrombi), retroperitoneal lymphadenectomy, and prostatectomy. Dr. Huang has published more than 125 articles in high-impact journals, including the Journal of Clinical Oncology, Lancet Oncology, the Journal of the American Medical Association, and the New England Journal of Medicine. He has lectured at both national and international meetings, particularly on improving outcomes following kidney cancer surgery. Dr. Huang continues to advance the field of urologic oncology through his research into novel approaches to the diagnosis and management of kidney, testicular, and non-muscle invasive bladder cancers.

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