Explosive growth of a renal tumor during active surveillance

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The incidence of small renal masses (≤ 4 cm) has increased over the past three decades. Partial nephrectomy remains the standard for treatment of such lesions, but increased attention is being given to patients who may benefit from active surveillance, given the low risk of metastatic spread and traditionally slow growth rates. Patients with significant comorbidities and the elderly are often considered optimal candidates for surveillance. We present an 86-year-old female undergoing active surveillance for a 1.4 cm lesion that grew in diameter approximately 0.5 cm per year over 3 years, followed by explosive growth to 7 cm in diameter with a retrohepatic inferior vena cava (IVC) thrombus over the subsequent 13 months.

Key Words: carcinoma, renal cell, active surveillance, tumor growth

Introduction

The incidence of small renal masses (SRMs), ≤ 4 cm, has increased over the past decades, in large part due to incidental detection of asymptomatic lesions with cross-sectional imaging. The majority of SRMs are renal cell carcinoma (RCC), though recent studies have demonstrated that at least 20% of SRMs are benign masses.[1] While treatment has yielded 5 year survival rates of > 90%,[1] much attention has been given recently to selection of patients who may benefit from active surveillance (AS). While no official cut off for AS exists, previous reports have shown the median growth rate of SRM to be roughly 0.3 cm per year with up to 30% of SRMs demonstrating no growth over a 3 year period.[2] Additionally, the malignant potential of RCC has been shown to increase with the size of the tumor,[3] with the metastatic potential of tumors < 3 cm generally under 5%.[2,3] We report a case of an 86-year-old female undergoing AS who saw explosive growth of her renal tumor from 2.7 cm to 7 cm over the course of 1 year, after 3 years of observation where the mass had grown at 0.4 cm per year. The volume of the tumor, assuming spherical shape, increased over 100-fold between discovery and operation.

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Figure 1. Axial CT, September 2008, showing 1.4 cm L renal mass.

Case report

An 86-year-old female with a 7 cm left renal mass, inferior vena cava (IVC) thrombus and bilateral pulmonary emboli was referred for further urologic consultation by an outside urologist. The patient initially presented to the outside urologist in September 2008 with a 1.4 cm renal mass, Figure 1 that was found incidentally on a stone protocol CT. Due to the small size of the lesion and the patient's age, the decision was made to follow the mass with serial CT scans every 6 months. Imaging over the next 3 years demonstrated growth of the mass to 1.7 cm in February 2009, 2.0 cm in August 2009, 2.4 cm in January 2010 and 2.7 cm in March 2011. Despite the growth of the mass, the patient desired no intervention given her age and perception the tumor was of fairly low metastatic risk. As a result, follow up with her outside urologist was subsequently scheduled for 1 year and in April 2012 she returned. A CT showed the mass had grown to a diameter of 7 cm with possible thrombus extension into the IVC, Figure 2. MRI confirmed the IVC thrombus extension to the confluence of the hepatic vein, Figure 3. A metastatic work up including bone scan was negative. The patient was referred to our institution for consultation and potential surgery. In the interim, she developed shortness of breath and was admitted on two occasions for pulmonary emboli, despite appropriate anticoagulation. After her second admission, her surgery was moved up due to suspicion of tumor emboli.

Cardiac and liver transplant surgeons were consulted and the patient was scheduled for a left radical nephrectomy with caval thrombectomy. Her case was complicated by apparent intraoperative pulmonary emboli, a liver capsulotomy, significant bleeding and cardiac arrest requiring resuscitation after the caval thrombectomy portion of the procedure. The nephrectomy was rapidly expedited as the patient was unstable and continued to have significant venous bleeding. Her abdomen was packed prior to rapid closure and transport to SICU. Her course was tenuous, with profound hypotension the remainder of the evening, and she died that night from complications following surgery. Final pathology showed a T3a, renal cell carcinoma, Fuhrman grade 3, 8 cm in greatest dimension.

Figure 2. Axial CT, April 2012, showing 7 cm L renal mass.

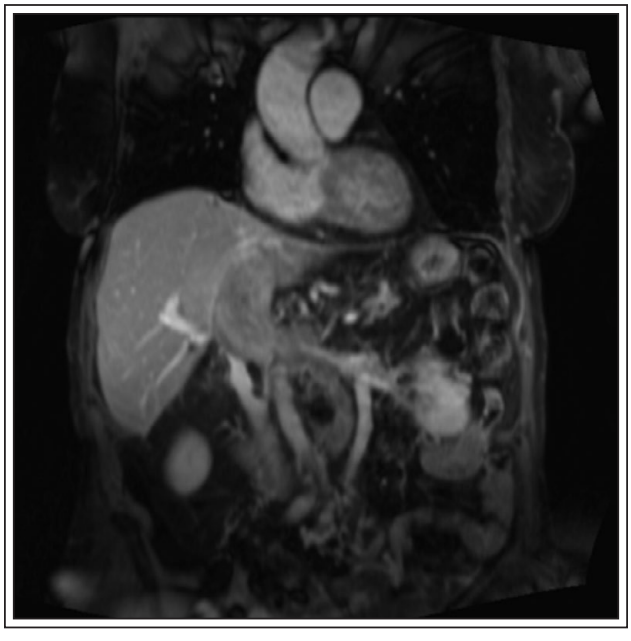

Figure 3. Sagittal MRI demonstrating inferior vena cava thrombus to the level of hepatic confluence.

Discussion

To our knowledge, this is the first report in the literature of a renal cell carcinoma demonstrating growth of this magnitude. The only other similar reported case in the literature was seen in a pregnant woman in 2011 who saw her angiomyolipoma grow from 3.4 cm to 9.6 cm over the course of 15 weeks.[4] The natural history of small renal masses has received much attention over the past decade and there is currently no consensus on when AS is absolutely indicated, largely due to difficulty determining the metastatic potential of such lesions.[3] Emerging research has demonstrated that many renal masses are appropriate for AS, especially when they are smaller than 3 cm[2,3] however, the question of when and how to treat these masses when they grow remains. Some advocate treatment for masses that grow more than 0.5 cm/year[5] while others feel that treatment should be pursued for masses that reach 3 cm-4 cm[3,6] due to increased metastatic potential.

Despite the low rate of metastatic disease from SRMs, intervention is often desired and as a result, renal mass biopsy has become an increasingly common modality by which to characterize SRMs. Classically, renal mass biopsy was reserved for suspected metastatic disease and plagued by high false negative rates as high as 18%.[7] This is no longer the case with a recent report demonstrated 91% sensitivity and 85.5% accuracy of percutaneous renal biopsy[8] and false negative rates reported at less than 1%.[7] For patients who are found to have malignant pathology, minimally invasive ablative therapies have become increasingly popular. This is especially so for patients who desire early intervention for SRMs, but who may not tolerate more aggressive surgery. Both radiofrequency ablation and cryoablation have shown excellent efficacy with 5 year disease-free survival rates near 90% for patients with masses < 3 cm.[9] In this case, no biopsy was performed.

Active surveillance is appropriate for many patients with SMRs but our case highlights the importance of frequent surveillance as well as the limited, but real potential dangers in observation. Previous studies have identified markers, including carbonic anhydrase, vimentin and gelsolin, p53 and PTEN among others, that can give prognostic value related to RCC though none can accurately predict tumor growth rates. At this point, there are no circulating factors that predict RCC.[10]

Our patient saw her tumor volume increase 100-fold over the course of 4 years of AS, including a 20-fold jump between years three and four. Although an octogenarian, this patient was in relatively good health and lived independently prior to the sequelae of her renal cancer. This case emphasizes the downside risk of observing small but growing renal masses. □

References

1. Campbell SC, Novick AC, Belldegrun A et al. Guideline for management of the clinical T1 renal mass. *J Urol* 2009;182(4): 1271-1279.
2. Chawla SN, Crispen PL, Hanlon AL, Greenberg RE, Chen DY, Uzzo RG. The natural history of observed enhancing renal masses: meta-analysis and review of the world literature. *J Urol* 2006;175(2):425-431.
3. Thompson RH, Hill JR, Babayev Y et al. Metastatic renal cell carcinoma risk according to tumor size. *J Urol* 2009;182(1):41-45.
4. Bettez M, Carmel M, Temmar R et al. Fatal fast-growing renal cell carcinoma during pregnancy. *J Obstet Gynaecol Can* 2011; 33(3):258-261.
5. Lane B, Tober C, Riedinger C, Growth kinetics and active surveillance for small renal masses. *Curr Opin Urol* 2012;22(5): 353-359.
6. Van Poppel H, Becker F, Cadeddu JA et al. Treatment of localised renal cell carcinoma. *Eur Urol* 2011;60(4):662-672.
7. Campbell S, Lane B. Malignant Renal Tumors (2011). In: Kavoussi L, Novick A, Partin A, Peters C, eds. Campbell-Walsh Urology. 10th ed. Philadelphia, PA: Elsevier. 2011:1418.
8. Salem, S, Ponsky L, Abouassaly R et al. Image-guided biopsy of small renal masses in the era of ablative therapies. *Int J Urol* 2012 Nov 27. Epub ahead of print.
9. Dib R, Touma N, Kapoor A. Cryoablation vs radiofrequency ablation for the treatment of renal cell carcinoma: a metaanalysis of case series studies. *BJU Int* 2012;110(4):510-516
10. Leppert JT, Pantuck AJ, Figlin RA, Belldegrun AS. The role of molecular markers in the staging of renal cell carcinoma. *BJU Int* 2007;99(5 pt B):1208-1211.