



Oncology

Radiographic evolution of a simple renal cyst to clear cell renal cell carcinoma in three years

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ABSTRACT

A 53-year-old female was referred for evaluation of a small right renal mass. She had an oncological history of adenocarcinoma of the cervix in 2015. Upon review of her imaging, her right posterior lower-pole lesion demonstrated malignant transformation from a 2.7-cm simple cyst in 2016, to development of a complex cyst with internal vascularity, and ultimately a 1.6 cm, right, lower-pole, exophytic, enhancing, posteriorly located solid renal mass concerning for renal cell carcinoma. The patient opted for surgical removal and underwent a right robotic-assisted laparoscopic partial nephrectomy. Pathology was consistent with a T1a clear cell renal cell carcinoma.

Introduction

Cystic renal disease is one of the most common benign lesions of the kidney. The Bosniak classification for complex renal cysts with malignancy rates of each Bosniak category has been well established. However, malignant transformation of simple cyst to cystic renal cell carcinoma is exceedingly rare, but has been reported with an incidence of 0–1%.¹ There have been two reported cases of malignant transformation of a simple renal cyst to clear cell renal cell carcinoma (RCC), which was diagnosed with laparoscopic unroofing of a large simple cyst.² This is a novel case that demonstrates malignant transformation of a simple renal cyst to an enhancing, solid renal mass in a 53-year-old female that was managed with a robotic-assisted partial nephrectomy. This case radiographically illustrates with serial surveillance imaging the evolution of a simple renal cyst to clear cell RCC in three years.

Case presentation

This is a 53-year-old female who was referred for evaluation of a small right renal mass. Her computed tomography imaging demonstrated a 1.6 cm, right, lower-pole, exophytic, enhancing, posteriorly located renal mass concerning for RCC (Fig. 1). She had an oncological history of cervical adenocarcinoma status-post chemo-radiotherapy and laparoscopic hysterectomy with bilateral salpingo-oophorectomy in 2015. She had no evidence of disease recurrence with surveillance imaging dating from 2016. Review of her imaging history revealed a right lower-pole lesion with significant changes in size and complexity over time.

This was a 2.7-cm simple cyst in September 2016 (Fig. 2A). Ultrasonography in February 2017 exhibited a renal cyst with a single thin septation (Fig. 2B). Surveillance ultrasound illustrated a complex cyst with internal vascularity in May 2017 (Fig. 2C). Computed tomography in December 2017 illustrated a 10-mm, non-enhancing low-attenuating lesion with a mildly thickened enhancing wall (Fig. 2D).

A discussion was held with the patient regarding the management of her renal mass. Active surveillance was reviewed given its small size and slow growth kinetics. Renal mass biopsy was discussed but not recommended given the prior cystic nature of the disease, risk of false negative evaluation, and unlikely to be a metastatic lesion despite her prior oncologic history of cervical adenocarcinoma that had no evidence of disease recurrence for many years. Given the patient's prior oncologic history, she was quite anxious and opted for surgical removal. She underwent a robotic-assisted laparoscopic right partial nephrectomy. Pathology was consistent with a T1a clear cell RCC, Fuhrman grade 2, with negative margins (Fig. 3).

Discussion

Simple renal cysts are generally associated with no malignant potential and the current guideline recommendations include no surveillance or follow-up imaging indicated.³ In a recent systematic and meta-analysis of the literature on the Bosniak classification utilizing computed tomography to determine its performance to diagnose malignant cystic lesions and the prevalence of malignancy in Bosniak categories demonstrated the pooled rate of malignancy of Bosniak I lesions

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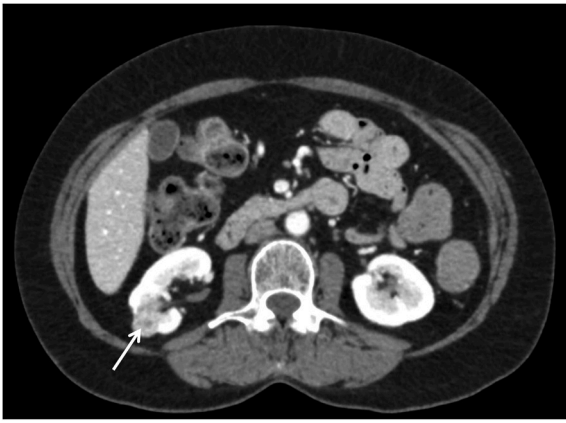


Fig. 1. Computed tomography imaging demonstrating a 1.6-cm heterogeneously enhancing solid renal mass (arrow).

as 3.2%.⁴ Computed tomography can accurately diagnose Bosniak classification with a specificity of 74% and can accurately rule out malignancy. This case presentation is a unique clinical scenario demonstrating radiographic evolution of a simple renal cyst to a Bosniak II cyst, subsequently Bosniak III cyst, and ultimately an enhancing, small renal mass with pathological diagnosis of clear cell RCC.

Previously literature describing malignant transformation of a simple renal cyst is invariably associated with renal cystic carcinoma or papillary RCC, and not necessarily the clear cell type. In the majority of reported cases, histological analysis of the cystic fluid at the time of a robotic or laparoscopic cyst unroofing had aided in diagnosis of malignancy.⁵ Here, the combination of computed tomography and ultrasonography clearly demonstrating transformation to a solid, enhancing mass rather than a cystic neoplasm. The management options in this setting of a small renal mass included active surveillance, local ablation (i.e. percutaneous radiofrequency ablation or cryoablation), or surgical resection. A minimally invasive approach with robotic-assisted laparoscopic was performed using a shared-decision making approach for definitive diagnosis and therapy.

Conclusions

This is the first reported case clearly illustrating with serial imaging the radiographic evolution of a simple renal cyst to clear cell RCC in three years diagnosed and treated with a robotic-assisted laparoscopic partial nephrectomy.

Declaration of competing interest

The author declares that there is no conflict of interest regarding the publication of this paper.

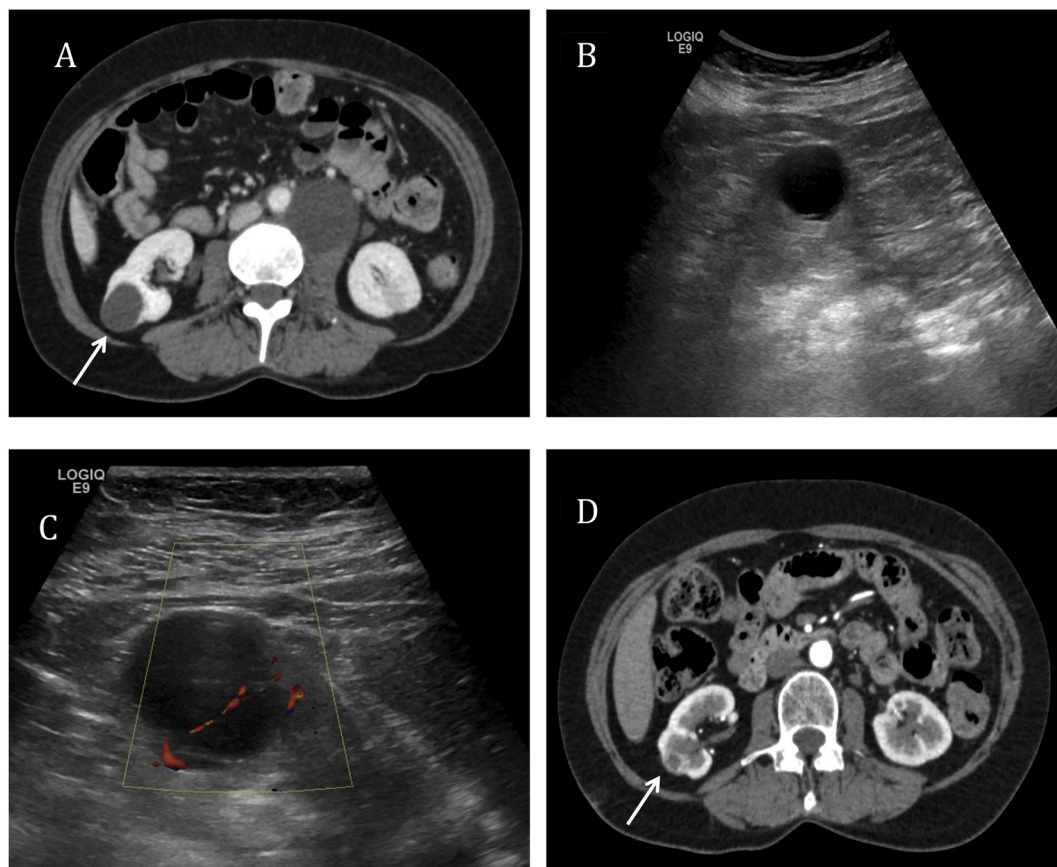


Fig. 2. A) Computed tomography imaging demonstrating a 2.7-cm simple cyst of the right lower-pole posterior kidney (arrow). B) Ultrasonography of the right kidney demonstrating a renal cyst with a single thin septation. C) Ultrasonography of the right kidney demonstrating a 3.1-cm complex cyst with internal vascularity. D) Computed tomography imaging demonstrating a 10-mm non-enhancing low-attenuating lesion of the right lower-pole posterior kidney with mildly thickened enhancing wall (arrow).

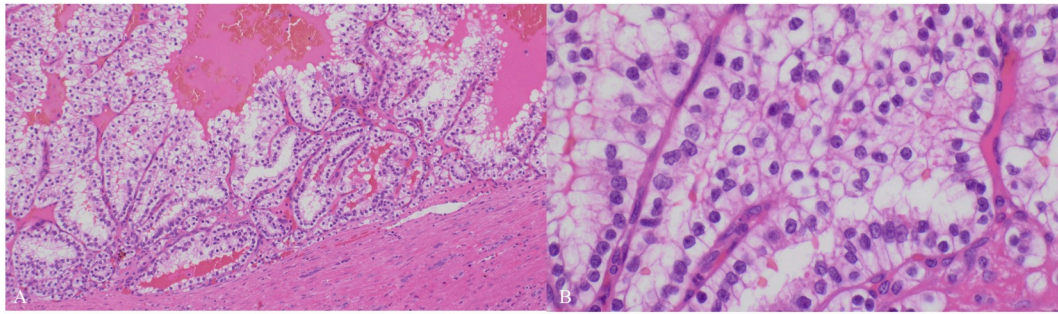


Fig. 3. The low magnification (A. 10x) H&E image demonstrates a well-circumscribed, encapsulated proliferation of clear cells forming trabeculae and nests surrounded by delicate fibrovascular septae and associated hemorrhage. These findings are classic for clear cell renal cell carcinoma. Prominent nucleoli are not readily identified at this magnification. At high power (B. 40x) however, the tumor cells demonstrate mildly pleomorphic nuclei with irregular borders and readily identifiable prominent nucleoli indicating an ISUP (International Society of Urological Pathology) tumor grade of 2 out of 4. No necrosis or sarcomatoid differentiation suggesting a higher grade tumor are identified.

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