

Oncology

Clear cell tubopapillary renal cell carcinoma mimicking polycystic kidney disease: A case report

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ARTICLE INFO

Article history:

Received 4 September 2017

Accepted 5 October 2017

Available online 15 October 2017

Keywords:

Clear cell tubopapillary renal cell carcinoma

ABSTRACT

Clear cell tubopapillary renal cell carcinoma (CCTP-RCC) is a distinct histologic subtype of RCC recognized for its unique clinicopathologic and immunohistochemical features. A 72-year-old man with presumed polycystic kidney disease (PKD) and bilateral clear cell RCC (CC-RCC) underwent left radical nephrectomy and right partial nephrectomy 20 years ago at an outside hospital. On surveillance imaging, RCC recurrence was suspected and right radical nephrectomy was performed. Histologic and gross examination of the right remaining kidney was consistent with CCTP-RCC. Review of his original pathology report revealed both kidneys in fact represented CCTP-RCC, mimicking PKD.

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1. Introduction

In 2015, there were 61,560 estimated new cases of RCC, 3.8% of all new cancer diagnoses in the US, and 14,080 estimated deaths. Common RCC histologic subtypes are CC-RCC, papillary (P-RCC), chromophobe, and collecting duct.¹ CCTP-RCC has been recognized for its distinctive clinicopathologic and immunohistochemical features and its lack of molecular alterations, especially compared to other RCC subtypes.^{2,3} We report a case of bilateral CCTP-RCC mimicking PKD.

2. Case presentation

A 72-year-old male with presumed PKD and bilateral RCC underwent a left nephrectomy and right partial nephrectomy in 1995 at an outside hospital. Pathology report from the surgical specimens then was notable for two RCCs bilaterally, and numerous cysts with atypical lining epithelium. In 2001, surveillance MRI revealed a 2cm enhancing lesion in the mid-to-lower pole of the remaining right kidney, which was subsequently treated with cryotherapy. In February 2013, surveillance imaging again identified innumerable cystic lesions, including an anterior lower pole

cyst that increased in size from 1.4cm in 2010 to 2.7cm, concerning for P-RCC. Close monitoring with surveillance continued. The patient then presented to our hospital. An MRI in April of 2016 revealed 9 solid and cystic, contrast-enhancing masses in his remaining right kidney, heightening the concern for RCC (Fig. 1). Also, the numerous cysts contained proteinaceous/hemorrhagic contents consistent with his assumed PKD.

In July of 2016, by our recommendation, the patient underwent right radical completion nephrectomy via a midline incision. Preoperatively, left radiocephalic AV fistula creation was performed in anticipation of hemodialysis initiation. The patient's postoperative course was uncomplicated. Pathologic analysis of the surgical specimen revealed innumerable renal epithelial neoplasms with solid and cystic components ranging from 0.1cm up to 3.7cm in size. The neoplasms showed prominent tubular architecture, low-grade tumor cells demonstrating a 'picket-fence' like arrangement, and clear cytoplasm, consistent with CCTP-RCC (Fig. 2). FISH analysis demonstrated no chromosomal rearrangements or 3p25 deletions. Although the patient was thought to have a history of PKD, thorough analysis of the kidney, including the non-neoplastic parenchyma, could not confirm this diagnosis. Instead the numerous cystic tumors mimicked the appearance of PKD (Fig. 3).

3. Discussion

RCC constitutes approximately 90% of primary renal neoplasms. Median age at diagnosis is 64.¹ Histologic subtype of RCC,

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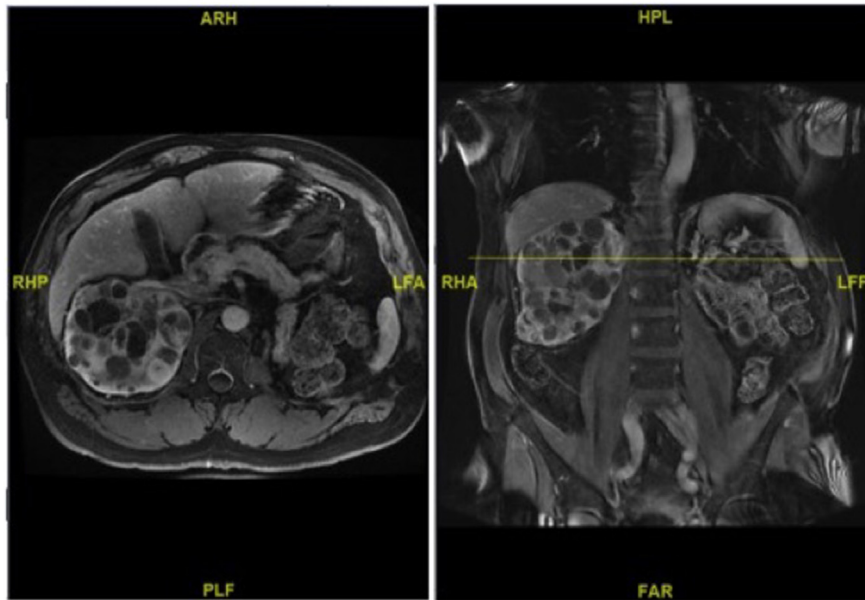


Fig. 1. MRI abdomen with and without contrast. Caption: MRI abdomen with and without contrast showing solid and cystic contrast-enhancing right renal masses along with an innumerable number of right renal cysts, many of which containing proteinaceous/hemorrhagic contents.

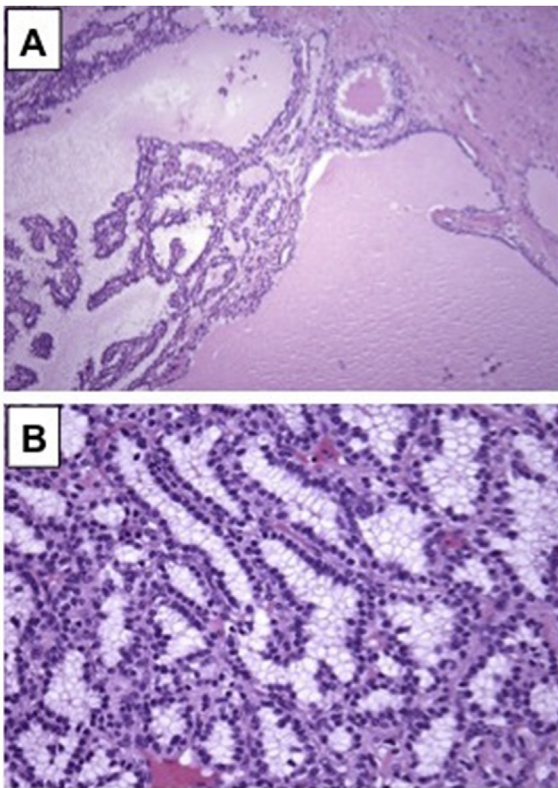


Fig. 2. Histology Photo. Caption: (A) At low magnification, papillary structures are seen projecting into the cystic spaces which contain eosinophilic material. Epithelial cells lining the cysts and papillae have clear cytoplasm. (B) At high magnification, solid areas of the tumor contain epithelial cells with a tubular growth pattern, clear cytoplasm, and low grade nuclei which are arranged in a "picket-fence" like configuration, the latter is a classic feature for clear cell tubulopapillary renal cell carcinoma.

established after surgical removal or biopsy of the renal tumor is based on the Union for International Cancer Control/American Joint Committee on Cancer 1997 consensus conference and the World Health Organization (WHO) 2004 renal tumor classification system. According to the WHO the three most common histologic RCC subtypes are CC-RCC, P-RCC, and chromophobe RCC.^{1,4} As early as 2006, a distinct histologic subtype of RCC with clear cell and papillary features, the CCTP-RCC, was described.⁵ In 2013 the International Society of Urological Pathology Vancouver Classification of Renal Neoplasia adopted CCTP-RCC as a unique subtype of RCC.⁴ We present a rare case of bilateral CCTP-RCC in a patient with multitudes of renal masses and history of presumed PKD.

CCTP-RCC presents with similar epidemiology as RCC, generally. Although initially reported as a subtype found in the context of ESRD, other studies have also demonstrated its presence in healthy kidneys.^{2,3} The incidence of CCTP-RCC is approximately 4%, a relatively common variant of RCC. CCTP-RCC tumors were noted to be grossly cystic in appearance, unilateral, well circumscribed with a mean tumor size of 2.6cm. Well over 90% of documented cases of CCTP-RCC are pathologic stage pT1 or pT2, the majority being less than 7 cm (pT1) in greatest dimension.² Key morphologic features on microscopic examination are a thick circumferential capsule, papillary architecture, branching tubules/acini and/or complex clear cell ribbons. A majority of cases demonstrate low Fuhrman grade nuclei with a very orderly 'picket-like fence' arrangement, located basally or apically in the cells, depending on the amount of cytoplasm in the cell.^{2,3,5} Our patient's unusual bilateral presentation is more typically associated with VHL-syndrome, however CCTP-RCC is not associated with any genetic alterations found commonly in CC-RCC or P-RCC.⁴ The latter demonstrate loss of heterozygosity in chromosome 3p and mutations in the VHL gene, and polysomy of chromosome 7 and 17 with loss of Y chromosome and c-met mutations, respectively.^{2,3,5} In contrast to CC-RCC and PRCC, CCTP-RCC is diffusely immunoreactive with CK7 and negative for CD10, α -methylacyl-CoA racemase and RCC antigen.^{2,3} Like CC-RCC, CCTP-RCC is diffusely positive for carbonic anhydrase IX, but with a distinct cup-like staining pattern.^{2,4}



Fig. 3. Gross Photo. Caption: Showing cut sections of the kidney with multifocal clear cell tubulopapillary renal cell carcinoma containing numerous solid and cystic areas, mimicking polycystic kidney disease.

In our case, the patient's pathology from the right kidney was consistent with the morphologic and immunophenotypic features found in CCTP-RCC. The outside pathology report from the patient's left radical nephrectomy and right partial nephrectomy categorized his tumors to be CC-RCC. However, upon review of the pathology report, the detailed description of the tumor's morphology, cytology, and immunohistochemical analysis was more in keeping with multiple CCTP-RCCs. Therefore, it was concluded that the multiple cystic lesions in both kidneys were more consistent with multiple solid and cystic CCTP-RCCs mimicking PKD.

4. Conclusion

The distinction of CCTP-RCC as a unique histologic subtype is

important because of its low-grade, indolent nature. It should be included in the differential diagnosis of any patient with documented solid and especially cystic renal tumors. Cases have very rarely been reported to metastasize. The large majority has an indolent clinical course.^{2,3,5} Given the role histologic subtype plays in prognosis and subsequent management, pathology classification systems and practice guidelines pertaining to renal cancer should be revised to include CCTP-RCC as a histologic subtype. Subsequently, research can be conducted to better define the clinical behavior and long-term progression of patients with CCTP-RCC.

Conflict of interest statement

No conflict of interest.

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