



Recognizing A Low-Grade Oncocytic Renal Tumor

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Abstract

Oncocytic renal tumors are sometimes challenging since oncocytic morphology found in several renal tumors due to the lack of a standardized diagnosis. Some tumors with "borderline or intermediate" features are descriptively reported as "oncocytic" and/or "unclassified". This case report highlights a low-grade oncocytic renal tumor.

Keywords: Chromophobe, renal cell carcinoma, hybrid tumor, low-grade, oncocytic tumor

Introduction

Oncocytic renal tumor diagnosis is sometimes challenging due to the oncocytic morphology in several renal tumors. The most common problem is the distinction between eosinophilic variant of chromophobe renal cell carcinoma (ChrRCC) and oncocytoma. Tumors with "borderline or intermediate" features are often descriptively reported as "oncocytic" and/or "unclassified" as main descriptive diagnosis terms preferring one or the other (1). However, some oncocytic tumors still do not fit into any available "oncocytic" tumor categories (2,3). Therefore, a comprehensive morphology, immunohistochemistry, and genetic profile research to precisely define and classify tumors with oncocytic morphology is important (2). This case report highlights a low-grade oncocytic renal tumor.

Case Report

All procedures performed in this study involving human participant were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Consent was obtained from the patient.

A 73-year-old female patient was admitted to the department of pulmonology due to extreme coughing. She had chronic renal failure and hypertension for 10 years. The computed tomography of the chest detected a solid mass in the lower pole of the right kidney (Figure 1). Irregularity was observed

in its contour compatible with fibrotic sequela in the middle pole of the ipsilateral kidney. The left kidney was atrophic. A dynamic enhanced magnetic resonance imaging evaluated the renal mass since the patient had compromised renal functions. The right renal mass was well limited and separated from the normal kidney parenchyma. It was overflowing from the kidney contour, but not exceeding the kidney capsule. A pseudocapsule appearance was observed around the mass. The internal lesion



Figure 1. Non-enhanced axial plan CT image showing the right kidney mass (arrows). The mass is well-circumscribed with similar density to the kidney parenchyma. The left kidney is atrophic in size

CT: Computer tomography

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structure was close to the kidney tissue in T1 and T2 weighted images, without significant fat contents. The enhanced image series enhanced the early phase, without contrast washout in the late phase. Pathological lymph node, solid organ metastasis, or renal vein thrombosis were not observed (Figures 2a-c). Radiological findings were compatible with low-grade RCC.

Pathological Findings

The patient underwent an open partial nephrectomy with pre-diagnosis of RCC based on radiological findings. The macroscopic examination revealed a partially well-circumscribed, non-encapsulated, solid, and tan-brown lesion in 35x32x21 cm diameter. Central scar was not observed. The microscopic examination revealed tumor cells with oncocytic cytoplasm, irregular nucleus, nucleolus, and focal perinuclear halo in some areas in solid pattern (Figure 3a-b). Thus, differential diagnoses included oncocytoma, ChrRCC, low-grade oncocytic tumor (LOT), eosinophilic clear cell RCC, epithelioid hemangioendothelioma, succinate dehydrogenase-deficient RCC, and hybrid oncocytoma-chromophobe tumor. The immunohistochemical examination found a diffusely positive reaction for EMA, cytokeratin (CK) 7, and PAX8. A negative reaction for immunohistochemical cluster of differentiation (CD) 10, CD117, alpha methacyl CoA racemase, RCC, HMB45, Melan A, and CK20 was recorded (Figure 4a-d). Therefore, the patient was diagnosed with LOT.

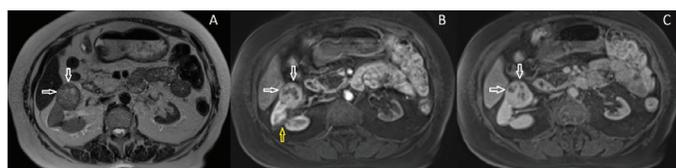


Figure 2. Dynamic enhanced MRI obtained in axial plan; T2W (a), arterial phase T1W (b), late phase T1W (c) images. The lesion is clearly seen in all images (white arrows). The mass without destruction is rapidly enhanced in the early arterial phase (b). Contrast washout is not observed in the late phase (c). Non-enhanced areas within the lesion are compatible with necrosis. The contour irregularity and notching seen in the right kidney middle section are compatible with the sequelae changes (b, yellow arrow). Radiological findings were found compatible with renal cell carcinoma

MRI: Magnetic resonance imaging

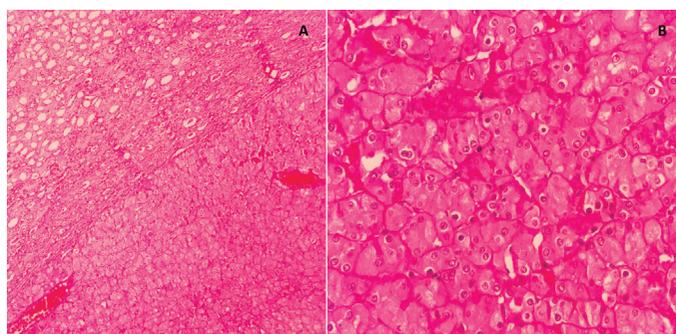


Figure 3. Microscopic features. Low-grade oncocytic tumor lacked a peripheral capsule and showed solid growth (H&E, 40X) (a), the cells demonstrated solid and compact acinar growth. The tumor cells had homogeneous oncocytic cytoplasm, uniformly round to oval nuclei (b) (H&E, 400X)

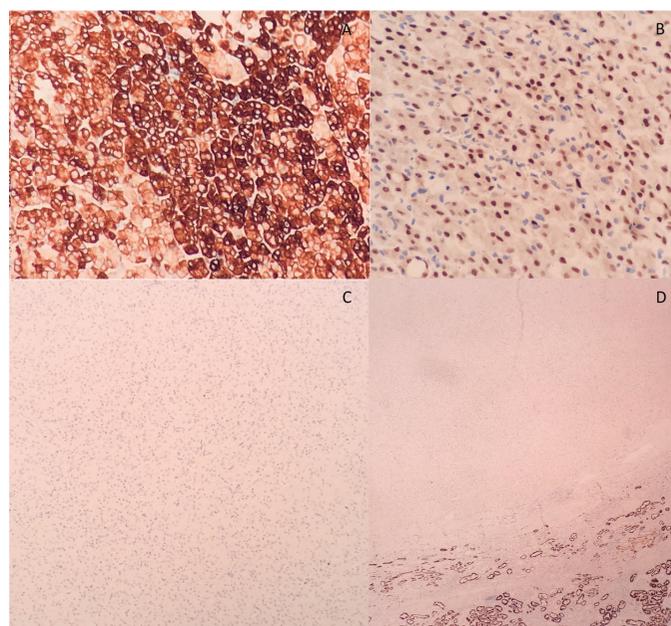


Figure 4. Immunohistochemical examination showing a positive reaction with CK7 (a) and PAX8 (b) and negative reaction with CD117 (c) and CD10 (d)

Discussion

Renal oncocytoma and ChrRCC were accepted as histological subtypes of renal tumors for years. ChrRCC is a malignant tumor, whereas renal oncocytoma is benign (4). A very little similarity was found between the classical histopathological appearance of ChrRCC and oncocytoma. However, serious problems are encountered in the eosinophilic variant differentiation of ChrRCC and oncocytoma. A great number of techniques, such as histochemical examinations, immunohistochemical examinations, chromosomal changes, molecular analyses, and electron microscopy were investigated to differentiate these two tumors for years, wherein immunohistochemical CD117 (KIT) and CK7 are most commonly used. CD117 and CK are positive in eosinophilic ChrRCC and oncocytoma. Moreover, CD117 and CK are positive in some oncocytomas with hybrid features. Using CD117 is helpful in differentiating typically CD117-negative tumors. Prevalent CD117 positivity supports ChrRCC. CK7 is generally negative in oncocytoma or typically positive in <5% of tumor cells (2). The oncocytic renal tumor differential diagnosis is presented in Table 1.

A study of 28 cases reported that LOTs showed a solid or compact nested growth pattern and the tumor cells had oncocytic cytoplasm with round to oval nuclei and focal perinuclear halo in microscopic examination. This study found CD117-/CK7+ in all cases. In addition, a negative reaction for CA9, CK20, vimentin, CK5/6, HMB45, Melan A, and CD15 was found. Frequent deletions detected at 19p13.3, 1p36.33, and 19q13.11 on array comparative genomic hybridization and disomic status was recorded in 2 out of 9 cases (3). Moreover, “high-grade oncocytic tumors” showing different morphology and immunoprofile from LOTs are defined in literature (5).

In conclusion, LOTs are tumors with oncocytic morphology, CD117-/CK+ immunoprofile, lacking multiple chromosomal

Table 1. Differential diagnosis of low-grade oncocytic renal tumor

Diagnosis	Pathological findings	Immunohistochemistry
Low-grade oncocytic tumor	-Solid sheets and compact nests with gradual transition to trabecular areas -Sharply delineated edematous stromal areas with loose cell growth	CD117-, CK7+, PAX8+
Chromophobe RCC, eosinophilic	-Solid growth -More prominent cell membranes, irregular (raisinoid) nuclei, perinuclear halos	CD117+, CK7+, CD10-
Oncocytoma	-Tubulocystic growth -Lacks perinuclear halos, central stromal “archipelaginous” areas are present	CD117+, CK7-/+
Clear cell RCC, eosinophilic	-At least focal clear cell areas, delicate vasculature in the background	CA9+, CD117-, CD10+
Epithelioid angiomyolipoma	-Epithelioid cells, pleomorphic, lacks perinuclear halos	PAX8-, MelenA+, Desmin+, HMBE45+, PANCK-, CK7-
SDH- deficient RCC	-Flocculent cytoplasm and vacuoles -Lacks perinuclear halos	CD117-, SDH-, PANCK-

RCC: Renal cell carcinoma

losses and gains, and exhibiting indolent clinical behavior. LOT shows oncocytic morphology in histopathological examination; however, its morphology does not completely fit into oncocytoma or eosinophilic ChrRCC. Therefore, the pathologist should support his diagnosis with immunochemistry. Estimating the actual LOT incidence is hard because these cases are previously reported as “eosinophilic ChrRCC,” “oncocytic renal tumor/NOS,” “unclassified/LOT,” or “hybrid oncocytoma-chromophobe tumor.” This study aimed to present LOT among newly defined oncocytic tumors to increase awareness.

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Ethics

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