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Case Report

Renal Oncocytoma With Specific Imaging Findings

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Abstract

Renal oncocytoma is a benign tumor with clinical features mimicking renal cell carcinoma. We present a 63-year-old man with a typical case of oncocytoma with specific image findings on computed tomography and angiography. Radical nephrectomy remains the appropriate diagnosis and treatment for large solid renal tumors of uncertain origin. (*Tzu Chi Med J* 2010;22(1):36–38)

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1. Introduction

Renal oncocytoma was first described by Zippel in 1942 (1), and it accounts for 3–7% of all solid renal neoplasms (2). In 2004, the World Health Organization defined oncocytoma as a benign renal epithelial tumor with a histological composition of large cells (oncocytes) with a mitochondria-rich cytoplasm. It is important to distinguish oncocytoma from renal cell carcinoma (RCC), which has a poor prognosis. The treatment for renal oncocytoma is also different from that for RCC. However, the diagnosis of renal oncocytoma is usually made after surgical removal of the tumor because of a lack of specific clinical features and imaging findings (3). We present here a case with specific imaging findings of oncocytoma.

2. Case report

Our patient was a 63-year-old man with a history of hypertension for 4 years. He had gross hematuria for 1 week in October 2008. The physical examination was normal except for a grade III systolic heart murmur. Chest radiography showed cardiomegaly. Laboratory screening tests were normal except for hyperuricemia. However, a urine examination showed numerous red blood cells per high power field. An abdominal ultrasound and renal computed tomography (CT) scan showed a homogeneous 5.5 × 5 cm mass in the upper left kidney, with the central part showing diminished contrast uptake (Fig. 1A). No pararenal lymph node enlargement was observed. Renal artery angiography showed a hypervascular tumor without a definite arteriovenous fistula (Fig. 1B). After evaluation of his cardiac function, the patient underwent left radical nephrectomy via a flank approach.

Macroscopically, there was one well-defined, nonencapsulated, brownish tumor measuring 6 cm in the greatest dimension confined to the renal parenchyma. A central stellate scar in the center of the tumor without necrosis or infiltration of the renal vein was observed. The renal pelvis was compressed but was not involved by the tumor (Fig. 1C). Microscopically, the

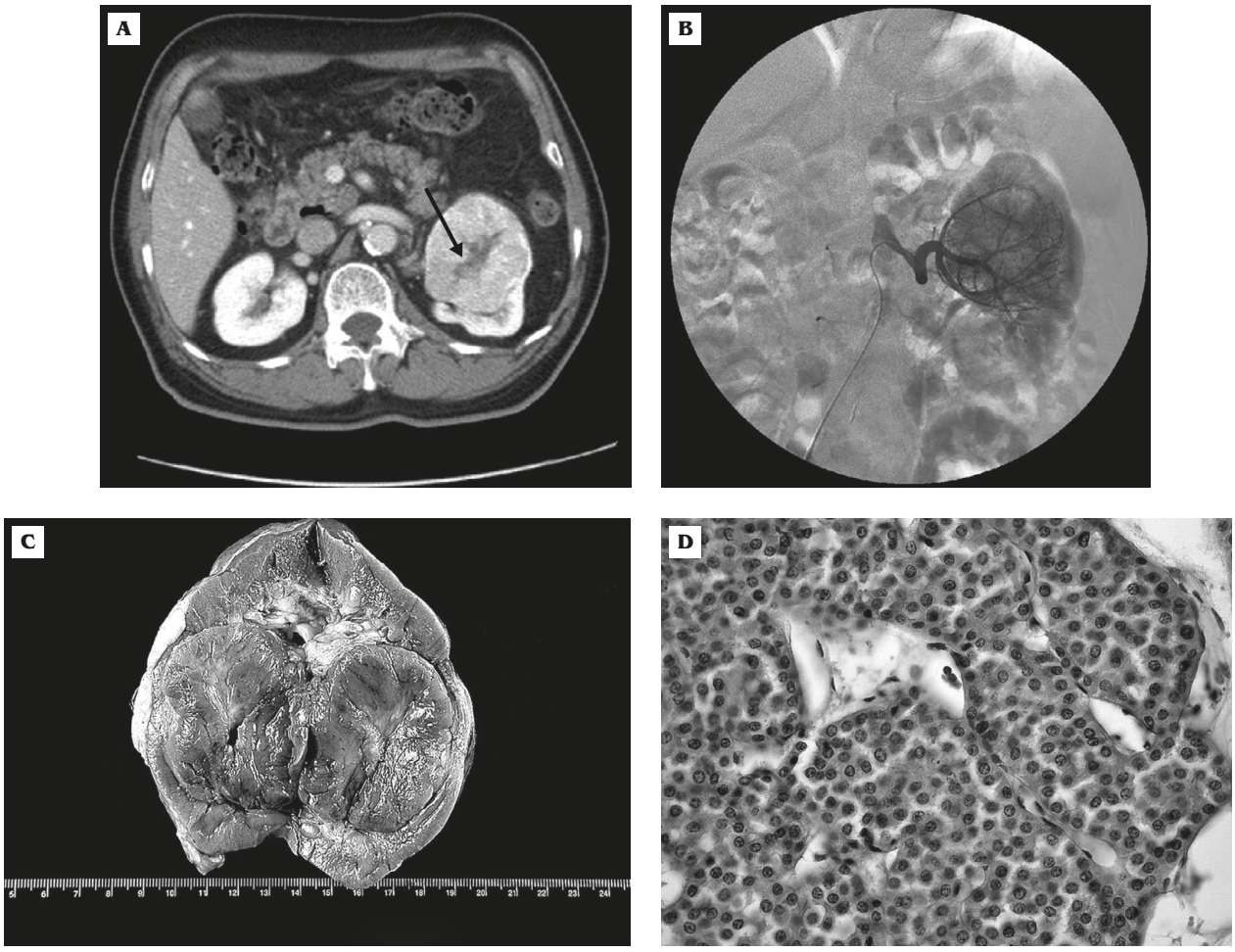

Fig. 1 — (A) Computed tomography shows a 5.5×5 cm left solid renal mass, which is well-defined with a central hypodense region (arrow). (B) Renal arterial angiography shows a hypervascular tumor with a spoke-wheel pattern. No arteriovenous fistula formation is seen. (C) Grossly, the tumor is solid, brownish and well-defined with central scar formation. No central necrosis is seen. (D) Microscopically, the tumor has abundant small lobular growth of round cells with bland nuclei and eosinophilic cytoplasm.

tumor had a morphological presentation of an oncocytoma with a small lobular growth of regular round cells with bland nuclei. The cytoplasm was eosinophilic with fine granulation (Fig. 1D).

3. Discussion

Renal oncocytoma is a benign renal epithelial neoplasm comprising 3–5% of all primary epithelial neoplasms in the adult kidney (4). Up to two thirds of patients are asymptomatic and the majority of these tumors are detected during a routine check-up for urinary tract infection or prostate disease (5). The most common presenting symptoms are abdominal pain, a palpable mass and macroscopic hematuria. The age at presentation is between 40 and 60 years. The male to female predominance is 2–3:1. Tumors have an average size of 6 cm (3). A renal oncocytoma is usually solitary, but bilateral and multifocal tumors have been noted. Most of the tumors are sporadic, but there are some inherited cases. Coexisting RCC is diagnosed in 2–32% of cases (6). Renal oncocytoma is a benign tumor, which does not metastasize, and it has an excellent prognosis.

Clinically, the differential diagnosis between oncocytoma and RCC is important because the characteristics of oncocytoma parallel those of RCC including sex distribution, peak occurrence, tumor size and clinical symptoms (7). In this case, the patient was investigated for gross hematuria and his characteristics coincided with those for oncocytoma.

Current state-of-the-art CT and magnetic resonance imaging technology may permit improved detection and better characterization of these two types of renal tumors. CT of an oncocytoma usually reveals a solid homogeneity of the lesion with a central stellate area of low density, whereas RCC often presents

as a heterogeneous tumor with central necrosis. On magnetic resonance imaging, most oncocytomas demonstrate low signal intensity relative to the renal cortex on T1-weighted images. Two thirds of cases have high signal intensity on T2-weighted images (8). This is very different from RCC where there is usually a medium-to-high intensity signal on T1 and a high intensity signal on T2. Renal arterial angiography shows a spoke-wheel vascular pattern and absence of neoplastic vessels. However, oncocytomas are indistinguishable from RCCs by imaging studies alone. These characteristics may suggest but cannot definitively diagnose oncocytoma. Our patient presented with typical images of oncocytoma on CT, although in most cases the central stellate area cannot be differentiated from central necrosis seen in RCC. Angiography in our patient also showed the characteristic spoke-wheel vascular pattern.

On microscopic examination, renal oncocytomas are composed of uniform round or polygonal eosinophilic cells, most commonly arranged in a nested or organoid growth pattern. There are atypical features including prominent nucleoli, conspicuous pleomorphism, cellular atypia, and hemorrhage or extension into the perinephric fat. However, it is not well accepted that tumors with these atypical features are oncocytomas (9).

Although a definite diagnosis can be made by renal biopsy, it is performed much less often in renal tumors than in other tumors such as those of the breast, prostate or liver. This is because of the difficulty in differentiation of oncocytoma from the granular form of conventional RCC or eosinophilic variants of chromophobe or chromophilic RCC. Another reason is that coexisting RCC is commonly diagnosed in oncocytoma in the same lesion, or at other locations in the same kidney (9). Currently, the most acceptable treatment for oncocytoma is radical nephrectomy. The reason for using radical nephrectomy is the uncertainty of the benign nature of oncocytoma before surgical intervention. A radical operation might be considered over-treatment (3), and therefore, a partial nephrectomy with nephron-sparing surgery is now considered the standard of treatment for oncocytoma, especially for those with a well-circumscribed solid tumor smaller than 4 cm with a typical central stellate scar on CT and no signs of metastases (5). If the tumor is larger than 4 cm, malignancy is still possible (10). The reasons for carrying out radical nephrectomy in this case were the difficulty in making a diagnosis based on the clinical features and imaging findings before surgery, and a tumor size over 4 cm.

In conclusion, our case had a typical oncocytoma presentation, although preoperative evaluation did not establish a definite diagnosis. Specific imaging findings including CT, magnetic resonance imaging and angiography permit a more precise approach but the reliability remains controversial. Radical nephrectomy remains the appropriate treatment for solid renal tumors of uncertain origin, whether benign or malignant. A partial nephrectomy is another appropriate alternative if oncocytoma is diagnosed, especially for small tumors with typical image findings. Overall, renal oncocytoma behaves as a benign tumor, and the long-term prognosis is excellent.

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