Ultrasonographic features of testicular metastasis from renal clear cell carcinoma that mimics a seminoma
A case report

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Abstract
Rationale Testicular metastases from renal cell carcinoma (RCC) are extremely rare. To the best of our knowledge, only 35 cases have been described in the literatures.

Patient concerns A 64-year-old male presented to our urology clinic for a palpable painless mass on his right side of the scrotum by self-examination 1 week ago, with a general abdominal ultrasonographic report showing a mass in his right kidney.

Diagnoses and interventions Scrotal B-mode ultrasound revealed a 15 × 13 × 15 mm well-defined round homogenously hypoechoic nodule with a halo at the upper pole of the right testis. Color Doppler and spectral Doppler ultrasound detected abundant intranodular and perinodular blood flow signals including both arteries and veins. Malignancy was suspected. Abdominal contrast-enhanced computed tomography identified an irregular tumor in the posterior side of the right kidney, highly suspicious for renal carcinoma. The patient received right radical nephrectomy and right partial orchiectomy. Histologically, the right renal mass was diagnosed as RCC, clear cell type, grade 2. As to the right testicular mass, a metastasis from renal clear cell carcinoma was confirmed.

Outcomes The patient has lived with no recurrence for at least 17 months without adjuvant therapy.

Lessons In the case, we focus on the ultrasonographic features of the testicular metastasis from RCC. Ultrasound could provide initial and helpful information for diagnosis. When finding a mass in the testicle on the ultrasound, although most of them are primary, it is important to know whether the patient has tumor history from other parts of the body. A halo may be a special feature for metastases. Contrast-enhanced ultrasound (CEUS) and ultrasonic elastography could provide more information for differential diagnoses.

Abbreviations: CEUS = contrast-enhanced ultrasound, EDV = end-diastolic velocity, PSV = peak systolic velocity, RCC = renal cell carcinoma, RI = resistance index.

Keywords: renal cell carcinoma, testicular metastasis, ultrasound

1. Introduction

About 25% to 30% percent of patients with renal cell carcinoma (RCC) will present with metastases at the time of diagnosis.[1] Typically, the most common attacked sites are the lungs (50%), bones (49%), lymph nodes (32%), skin (11%), liver (8%), and brain (3%).[2] To our best knowledge, testicular metastasis from RCC is extremely rare. Appropriately 35 cases have been reported in the literature.[3–6] A very few of them have reported the ultrasonographic features of metastases from RCC.[3,4] We present a case of a patient with a right testicular metastasis secondary to clear cell RCC and describe its features on duplex ultrasound in order to assist diagnosis.

2. Case presentation

A 64-year-old male presented to our urology clinic for a palpable painless mass on his right side of the scrotum by self-examination 1 week ago. A general abdominal ultrasonography, performed at local hospital 3 months ago, showed a mass in the patient’s right kidney. During this period, the patient denied any history of clinic manifestation or trauma. His medical history was significant only for hypertension. Physical examination revealed percussed pain in his right flank. Scrotal examination found a palpable, stiff, painless mass in his right testis which is still in the normal size. Superficial lymph nodes were not palpable, nor was inguinal hernia. Scrotal B-mode ultrasound, using an iU22 ultrasound system (Royal Philips, Amsterdam, The Netherlands) equipped with a high-frequency (5–12 MHz) linear array transducer, revealed a well-defined round, homogenously hypoechoic nodule with a halo at the upper pole of the right testis (Fig. 1A). The size of the mass was about 15 × 13 × 15 mm. The color Doppler...
ultrasound (Fig. 1B) and spectral Doppler ultrasound detected abundant intranodular and perinodular blood flow signals, including veins and arteries (peak systolic velocity (PSV): 6.14 cm/s, end-diastolic velocity (EDV): 2.29 cm/s, resistance index (RI): 0.63). Malignancy was highly suspected. Meanwhile abdominal contrast-enhanced computed tomography identified a 5.4 cm x 4.7 cm sized irregular inhomogeneous enhanced mass in the posterior side of the right kidney, which broke through the kidney capsule, still within Gerota’s fascia, without obvious renal vein, adrenal, or retroperitoneal involvement (Fig. 2). Other imaging examinations for evaluating metastasis were negative. The laboratory tests were within normal level. Then a right radical nephrectomy was performed in December 2016, followed by a right partial orchiectomy a few days later. Grossly, the right kidney tumor was red-and-white fish-like appearance with liquefied necrotic component, adhered to peripheral tissue with renal capsular invasion, and close to Gerota’s fascia. Histologically, it was diagnosed as RCC, clear cell type, grade 2. As to the right testicular mass, macroscopic examination of the operate specimen showed a yellow hard lesion at the upper pole of the right testis with clear margins, within the albuginea. Pathologic study revealed metastasis from RCC (Fig. 3). Immunochemically, the tumor cells showed positivity for CD10 and CA9 and negativity for inhibin-α and WT-1. These results were compatible with a metastasis from renal clear cell carcinoma. Postoperative follow-up examination showed no other metastases. The patient has lived with no recurrence for at least 17 months without adjuvant therapy.

In this paper, ethical approval was not necessary, as this article is a case report, which is based on the clinical information of the patient. Informed written consent was obtained from the patient for publication of this case report and accompanying images.

3. Discussion

Testicular metastases are uncommon, which are most often incidentally found at autopsy in patients who have died of cancer.[7] Metastases represented 1.4% of all testicular tumors biopsied.[8] The most common primary sources are prostate tumors (35%), lung tumors (19%), malignant melanoma (9%), colon tumors (9%), and kidney tumors (7%).[9] Bandler et al[4] reported the first case of RCC metastatic to the testis in 1946. Through the reported 35 cases, all of which were clear cell carcinoma except for 1 case. These patients’ ages ranged from 46 to 87 years old (mean 63). They did not have any histories of
scrotal diseases. A total of 17 patients, nearly 50 percent, had multiple metastases. The majority of patients had an ipsilateral metastasis. However, there was no significant difference whether it was ipsilateral left or right. Moriyama et al\(^{[10]}\) reported the only case of bilateral testicular metastases from RCC. After viewing the previous literatures, one of the main explanations of testicular involvement in RCC is a retrograde venous spread via the spermatic vein according to anatomic outlet of spermatic vein into renal vein at left side,\(^{[6]}\) which could hardly explain the contralateral or ipsilateral right metastases, such as the case we report. Arterial extension, lymphatic extension and endocanalicu-"