RENAL ONCOCYTOMA IN ACQUIRED RENAL CYSTIC DISEASE

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Abstract: Renal oncocytoma is a rare benign tumor of the kidney that accounts for about 5% of renal tumors. Acquired renal cystic disease (ARCD) is commonly seen in dialyzed patients. Although the occurrence of renal oncocytoma in ARCD has rarely been reported, we report such a case in a 67-year-old man who had hypertension-associated end-stage renal disease and had received regular hemodialysis for 5 years. Radiologic diagnostic studies demonstrated a renal mass in the left atrophic cystic kidney that increased in size from 2 cm to 4 cm during 2 years of follow-up. Under the diagnosis of renal cell carcinoma, he received left radical nephrectomy. The pathologic examination revealed renal oncocytoma with a well-circumscribed, homogenous, mahogany-brown tumor on a background of ARCD. Although patients with ARCD have a higher incidence of renal malignancies, renal oncocytoma may occur in these patients and may be managed conservatively.

Case Report

A 67-year-old male patient presented with the complaint of repeated gross hematuria, which had worsened over the past few months. He had no fever, body weight loss, or flank or abdominal pain. At abdominal examination, no mass or organomegaly was detected.

Hypertension had been diagnosed 15 years previously, and he had received regular anti-hypertensive medication since then. Three years prior to this admission he developed uremia and had begun regular hemodialysis. Renal sonography 1 year after the start of hemodialysis showed that both kidneys were atrophic, with multiple cysts and a hypoechoic mass of 2 cm in the lower pole of the left kidney. CT confirmed the presence of the mass. Urinary cytology was negative for malignancy. Repeat renal sonography 1 year later confirmed the presence of a well-demarcated, low-echoic, non-homogenous mass (3.2 x 3.5 cm) in the lower polar region of the left kidney. Abdominal CT demonstrated a well-enhanced left renal mass with a distinct margin and irregular contour (Fig. 1).
Because gross hematuria had developed recently and follow-up abdominal CT showed progressive enlargement of the left renal mass (4.0 x 4.0 cm), renal cell carcinoma was suspected. Radical left nephrectomy was performed through a transabdominal approach. No enlarged lymph nodes were observed. Gross pathologic examination of the kidney showed granularity of the surface and multiple small cysts in the parenchyma. On gross section, a well-circumscribed homogenous tumor (3.8 x 3.7 x 3.3 cm) that was mahogany brown in color was found at the mid-portion of the left atrophic kidney. The cut surface was mahogany brown with pink and gray areas. There was a central depressed zone (scar) in the central portion of the tumor. Neither corticomedullary scar nor deformed calyx was noted. Microscopically, the lesion consisted of sheets of uniform polygonal cells with central small nuclei and abundant eosinophilic granular cytoplasm (Fig. 2). The cells were arranged in a tubular structure and no nuclear pleomorphism, mitotic activity, clear cells, or papillary configurations were noted. The pathologic diagnosis was renal oncocytoma and acquired cystic disease of the kidney. Our patient's recovery was uneventful and he was discharged on the eighth postoperative day.

Discussion

Renal oncocytoma is a benign neoplasm of the kidney and accounts for about 5% of renal parenchymal neoplasms [1]. The incidence of simultaneous association with ARCD is not known and to the best of our knowledge only four cases have been previously reported [8, 9]. Renal oncocytomas are usually well circumscribed, homogenous, mahogany-colored tumors. They are slow-growing tumors with pushing borders that compress adjacent renal parenchyma and may give a gross impression of encapsulation [8]. On bisection, the characteristic uniform ruddy tan to mahogany brown color is classically found. Except for the largest lesions, little or no evidence of necrosis or hemorrhage is seen but sometimes a central fibrosis scar is present. This gross pathologic character is in contrast to renal cell carcinoma, which commonly shows areas of hemorrhage and necrosis [1]. In our patient, the renal oncocytoma was well circumscribed and characterized by the absence of necrosis and hemorrhage. No invasions or metastases to adjacent tissues were noted. In addition, a characteristic central area of fibrosis or scar was noted macroscopically.

Oncocytomas may show foci of cystic formation (about 6%) and areas of hemorrhage (about 6%), some of which may extend into the perirenal adipose tissue or into the renal pelvis. The tumors may be

Fig. 1. Computerized tomogram of the abdomen (after contrast enhancement) demonstrates a hyperdense mass (3.2 x 3.5 cm) with a distinct margin and irregular contour in the left atrophic and cystic kidney.

Fig. 2. A) Renal oncocytoma consists of sheets of uniform polygonal cells with central small nuclei and abundant eosinophilic granular cytoplasm. The cells are arranged in a tubular structure. Atrophic tubules are seen adjacent to tumors. B) The tumor is composed entirely of large polygonal cells with granular eosinophilic cytoplasm, distinct cell borders, and uniform round nuclei. Neither necrosis nor mitosis is evident. (Hematoxylin and eosin; A x 200, B x 400)
bilateral and/or multifocal. Necrosis is an unusual finding in an oncocytoma. A rare, long-standing lesion might have necrotic material with cholesterol clefts, hemosiderin, histiocytes, and fibrosis, but necrosis resulting from rapid tumor growth is suggestive of renal carcinoma and rules out the diagnosis of oncocytoma. Oncocytes, which are large epithelial cells with granular cytoplasm, constitute oncocytomas. Most often renal oncocytomas have a low potential for malignancy and they are thought to arise from the distal tubule [12] and, in contrast to renal carcinoma, are not associated with abnormalities of chromosome 3. The term renal oncocytoma should probably be used to characterize a well-differentiated renal tumor with eosinophilic granular cells that behaves in a biologically nonvirulent fashion. The oncocytes are densely packed with mitochondria. One genetic subset of renal oncocytomas showed a mixed population of cells with both normal and abnormal karyotypes [13]. Another subset showed balanced translocation between chromosome 11q13 and other chromosomes. A third subset was marked by loss of the Y chromosome and chromosome 1. Molecular studies have shown a recurrent rearrangement of mitochondrial DNA in renal oncocytomas [12].

Oncocytoma may be identified preoperatively by a central stellate scar on CT. However, in tumors of small diameter, CT does not permit differentiation of the tumor completely from renal cell carcinoma. In our patient, the absence of classical CT findings of oncocytoma and the progressive growth of the renal mass made it impossible to rule out a malignant neoplasm preoperatively. Association of renal oncocytoma with cystic kidney disease such as ARCD or simple cyst is rarely reported. Renal oncocytoma may sometimes present as a multicystic tumor that results from cystic degeneration of renal oncocytoma [14]. Renal tumors are three to six times more frequent in individuals with ARCD than in the general population [7, 15, 16]. Most renal tumors are adenomas or renal cell carcinomas. ARCD develops more frequently in males than in females, in a ratio of 3:1, and renal cell tumors also develop preferentially in male patients, in a ratio of 7:1 [17]. However, the development of an oncocytoma in a kidney with ARCD is rare. In the four reported cases of oncocytoma in patients on dialysis, the median age was 58 years, with an average time on dialysis of 6 years. The diameters of the tumors were 5, 9, 5, and 5 cm, respectively. The clinical presentation was incidental in three cases, with gross hematuria in one. Our patient was older (67 yr old) and presented with gross hematuria. Interestingly, all reported cases of oncocytoma, including the present case, were found on the left atrophic kidney. Unlike in one previously reported case [18], we did not observe any epithelium with oncocytic characteristics covering the cystic walls. Oncocytic hyperplasia was previously reported as proliferating from the wall of the cyst similar to cysts seen in renal cell carcinoma [5]. The development of renal oncocytomas in cystic kidney diseases suggests that cystogenicity may somehow be related to tumor formation. Despite the benign behavior and excellent prognosis of oncocytoma, the presence of a nodule in an atrophic cystic kidney makes it necessary to exclude the existence of a malignant neoplasm. Renal cell carcinoma is commonly associated with ARCD [5]. Furthermore, renal cell carcinoma and oncocytoma coexisting in the same kidney has been reported [19].

In conclusion, renal oncocytoma, although rare, can develop from the epithelium of cysts in kidneys affected by ARCD. It is imperative to screen atrophic, cystic kidneys in patients on long-term dialysis. Sonography is useful for the incidental and early detection of solid renal masses.

References


