CASE REPORT

Malignant Fibrous Histiocytoma Arising from the Renal Capsule

Kazuhiro Kitajima*, Yasushi Kaji, Mizuho Morita, Yoshihiro Okuda, and Kazuro Sugimura

1Department of Radiology, 2Department of Urology, Kobe National Hospital
3-1-1 Nishiochiai, Suma-ku, Kobe, Hyogo 654-0155, Japan
3Department of Radiology, Kobe University Graduate School of Medicine, Kobe, Japan

(Received June 24, 2003; Accepted December 17, 2003)

Malignant fibrous histiocytoma (MFH) arising from the renal capsule is a rare tumor. We report a case of 55-year-old man with this tumor. Radiological imaging, including magnetic resonance (MR) imaging, was helpful in the differential diagnosis between MFH of the renal capsule and other renal tumors. In particular, a hypointense area identified on T2-weighted images reflecting the fibrous component was identified as an important characteristic of renal MFH.

Keywords: malignant fibrous histiocytoma (MFH), renal capsule, computed tomography (CT) scan, magnetic resonance (MR) imaging, angiography

Introduction

Malignant fibrous histiocytoma (MFH) is believed to arise from primitive mesenchymal cells that demonstrate both histiocytic and fibroblastic differentiation. It is the most common soft tissue sarcoma in adults, comprising almost 20% of all soft tissue tumors.1,2 Although the majority of MFH occur in the trunk and extremities, retroperitoneal primary MFH are not uncommon, comprising 16% of 200 reported cases.1 However, MFH arising from renal parenchyma or renal capsule are rare. Moreover, few reports in the literature document its imaging features. We report the imaging features of a case of MFH arising from the renal capsule.

Case Report

A 55-year-old man was admitted to our hospital with the chief complaint of left lower abdominal pain. Physical examination as well as laboratory and urinary data were unremarkable. Postcontrast CT revealed a 10 × 10 × 8.5 cm mass adjacent to the inferior portion of the left kidney (Fig. 1). The mass exhibited inhomogeneous minimal enhancement with slightly higher attenuation than the skeletal muscle. The left renal vein and the inferior vena cava were visualized clearly. No metastatic lymph node swelling was seen. MR imaging was performed with a 0.5T unit equipped with a body coil. T1-weighted spin-echo images (TR/TE = 610/12 ms) showed a homogeneous iso-intense mass with slightly hypointense areas (arrows; Fig. 2a). T2-weighted fast spin-echo images (TR/TE = 3,200/100 ms) showed a heterogeneous mass of

*Corresponding author, Phone: +81-78-382-6100, Fax: +81-78-382-6129, E-mail: fwkd6871@mb.infoweb.ne.jp
Fig. 2. (a) T₁-weighted spin-echo images (TR/TE = 610/12 ms) showed a homogeneous iso-intense mass with slightly hypointense areas (arrows) relative to the normal renal parenchyma. (b) T₁-weighted fast spin-echo images (TR/TE = 3200/100 ms) showed a heterogeneous mixed intense mass with a very hyperintense central area. (c) Gd-DTPA-enhanced T₁-weighted spin-echo images (TR/TE = 610/12 ms) showed a heterogeneous enhancement of the tumor without enhancement of the central portion.

Fig. 3. A selective left renal angiogram shows a tumor with mild staining fed by the renal capsular artery. (a) arterial phase (b) venous phase

mixed signal intensity (Fig. 2b). The central portion of the mass was extremely hyperintense on T₂-weighted images, suggesting cystic degeneration. T₁-weighted spin-echo images (TR/TE = 610/12 ms) enhanced with gadolinium-diethylene-triamine-pentaacetic acid (Gd-DTPA) showed a heterogeneous enhancement of the tumor without enhancement of the central portion (Fig. 2c). A selective left renal angiogram showed a tumor with mild staining fed by the renal capsular artery (Fig. 3). The patient underwent left radical nephrectomy. A solid, well-demarcated, pinkish-
The tumor, measuring 10.5 cm in its greatest dimension, was located inferiorally adhering to the left renal capsule (Fig. 4a). Cystic degeneration was visible in the central portion. The mass had neither invaded the renal parenchyma nor extended through Gerota's fascia. Microscopic examination of the tumor demonstrated proliferation of fibrohistiocyte cells with a faint storiform pattern in most cellular areas (Fig. 4b). Immunohistochemical staining revealed spindle fibrohistiocyte cells stained positively for α1-antitrypsin and vimentin. Histopathological diagnosis was storiform-pleomorphic MFH arising from the renal capsule. No adjuvant therapy was performed, but the patient has remained healthy for 30 months since the operation without evidence of recurrence.

Discussion

Primary sarcomas of the kidney in general are rare, accounting for only 1% to 3% of malignant renal tumors. Furthermore, MFH arising from the renal parenchyma or renal capsule represent less than 6% of renal sarcomas. The renal capsule comprises fibrous tissue, nerves, smooth muscle, blood vessels, lymph duct, and perirenal fat. A benign or malignant tumor can develop in any of these tissues.

Here we describe the radiologic characteristics of MFH. CT scans typically show a large, lobulated, relatively well-defined soft-tissue mass that often contains central areas of decreased attenuation, corresponding to regions of myxomatous tissue, cystic degeneration, hemorrhage or necrosis. Solid components of the mass are enhanced. CT is useful for detection of calcification (20%) and cortical erosion in deeply situated tumors. The angiographic features of MFH include marked hypervascularity and early venous return. Hypervascularity has been described in instances of scarce cellularity due to the predominance of necrosis and hemorrhage. However, the vascularity of MFH remains controversial, and some investigators have reported that these tumors are hypovascular or avascular.

In a review of the literature, mere dozens of cases of MFH arising from renal parenchyma or renal capsule have been reported. In most cases, primary renal MFH presents with less parenchymal involvement in imaging studies and with more frequently normal urine analyses than does renal cell carcinoma (RCC). Previous MR imaging reports reveal only limited information about this tumor. Most reports reveal the tumor to be hypointense on T1-weighted images and iso- or hyperintense with hypointense areas on T2-weighted images. These reports also indicate gradual and heterogeneous enhancement with Gd-DTPA. In addition, in 11 reports of angiography, hypervascularity was apparent in three cases (27.3%), hypovascularity in six cases (54.5%), and avascularity in two cases (18.2%).

Our case exhibited diagnostic imaging features consistent with previous descriptions of MFH. The central portion of the tumor, which suggested cystic degeneration in MR images, was confirmed histologically. It has been speculated that the area appearing hypointense on T1-weighted images and hyperintense on T2-weighted images reflects a histiocyte cell-rich region, cystic degeneration or necrosis, while the area appearing hypointense in both T1-weighted images and T2-weighted images, which was also seen in our case, reflects a fibroblast cell-rich region. However, it is likely that these features of MR imaging are true only of the histological storiform-pleomorphic type (50%-60%).

Vol. 2 No. 4, 2003
not of the other subtypes (myxoid, inflammatory, giant cell, and angiomatoid).

In conclusion, although renal MFH is indistinguishable clinically and radiologically from RCC (especially papillary RCC characterized by a hypointense area on T2-weighted MR images and hypovascular enhancement) and other renal sarcomas (fibrosarcoma, leiomyosarcoma, liposarcoma, and hemangiopericytoma) preoperatively, renal MFH must be considered when specific features exist radiologically: 1) the tumor’s size exceeds 10 cm at the time of diagnosis and does not involve the renal parenchyma and vein (renal vein and inferior vena cava); 2) the tumor has various signal intensities on MR images and the hypointense area on both T1-weighted images and T2-weighted images reflects fibrous components, while the hypointense area in T1-weighted images and the hyperintense area in T2-weighted images reflects cystic degeneration, necrosis or histiocyte cell-rich region; 3) the tumor is hypovascular or avascular in angiography; and 4) in CT scans, there is a low attenuation area reflecting multilocular cystic degeneration and a high attenuation area reflecting calcification.

References


