Case report

Benign solitary fibrous tumor of the retroperitoneum: radiological features

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Abstract

We present the case of a benign solitary fibrous tumor of the retroperitoneum and describe its radiologic characteristics. MRI was more sensitive than US or CT for determining the retroperitoneal origin, and for orienting tumor histology and reducing the differential diagnosis with other retroperitoneal tumors.

Keywords: Retroperitoneal space, neoplasms; Neoplasms, CT; Neoplasms, MR; Neoplasms, US; Solitary fibrous tumor

1. Introduction

Solitary fibrous tumor is an uncommon neoplasm affecting adults and typically located in the pleura. The origin of solitary fibrous tumor is controversial, though a mesenchymal rather than a mesothelial origin is currently accepted as the most probable [1]. We present the case of a patient with fibrous solitary tumor originating in the retroperitoneum and describe the radiologic findings, placing emphasis on the usefulness of MRI.

2. Case report

A 54-year-old woman with no relevant pathologic history was seen to investigate a mass in the region of the hypogastrium. On physical examination, a hard lump that displaced laterally was palpated in the infraumbilical region. It was not painful and the remaining physical examination and analytical results were normal. Abdominal plain films showed a 3 x 3.5-cm homogeneous calcification with well-defined margins projecting over the sacrum (Fig. 1).

On abdominal US using a 3.5 MHz convex transducer (4C1) with a harmonic tissue program (Sequoia 512 Imagegate, Acuson Corporation, Mountain View, CA, USA), a solid, echogenic 5 x 6-cm mass, showing vascularization on Doppler, was seen in the hypogastrium. It extended from the anterior abdominal wall to the sacrum, and, because of its large size, it was difficult to determine its origin (Fig. 2).

Abdominal helical CT (PQ 5000, Picker International, Inc., Highland Heights, OH, USA) demonstrated a mass with an attenuation coefficient similar to muscle and a right posterolateral peripheral calcification. After iodinated contrast injection, the mass demonstrated significant enhancement in the portal phase except for several small areas of slight enhancement interpreted as areas of necrosis, fibrosis or mixoid degeneration (Fig. 3).

Abdominal MRI was performed on a 1.5 T unit (Giroscan Intera, Philips Medical Systems, Netherlands), using a phased-array coil with the following sequences: axial breath-hold fast-feel echo (FFE), T1-weighted repetition time ms/echo time ms/flip angle = 157/2.3/80, 8 mm-thick sections, axial fat-saturated T2-weighted turbo spin-echo repetition time ms/echo time ms = 1800/85, turbo factor = 16, 8 mm-thick sections with respiratory
compensation and dynamic scanning, 3D-FFE T1 repetition time ms/echo time ms/flip angle=5/1.6/40, 2.5 mm-thick sections after bolus (2 ml/s) gadolinium injection by infusion pump. Angiographic MIP and multiplanar reconstructions were performed. MRI demonstrated a mass isointense to muscle on T1-weighted sequences (Fig. 4). A heterogeneous, but predominantly hypointense signal was seen on T2-weighted sequences, interpreted as extensive areas of fibrosis (Fig. 5). All the sequences showed a dark, 3-cm diameter dark signal area in close contact with the right psoas muscle and forming part of the mass; this corresponded to the calcification seen on plain films and CT.

In the dynamic study, the tumor enhanced strongly after intravenous contrast administration except in several small areas (Fig. 6). Angiographic reconstructions showed displacement of the right iliac artery, which took on an anterior course around the mass; a fact supporting retroperitoneal positioning (Fig. 7).

Under the presumptive diagnosis of retroperitoneal tumor of probable fibrous nature, the mass was removed surgically and the retroperitoneal location was confirmed. The tumor was well circumscribed and had a smooth, shiny surface. The cut surface had a whitish-yellow homogeneous appearance with a peripheral calcification. Histological study demonstrated mainly collagen fibers in a fascicular pattern and some small vessels. The cells were positive for vimentin and CD34. There was no evidence of mitosis or degeneration. The final histological diagnosis was benign solitary fibrous tumor. There were no complications in the immediate postoperative period, and clinical and CT follow up showed no evidence of recurrence at 13 months after the procedure.
3. Discussion

Solitary fibrous tumor is a clinically asymptomatic neoplasm of probable mesenchymal origin, occurring in adults. For decades there has been controversy as to its histological origin and it has received many names, such as benign mesothelioma, submesothelioma, localized fibrous tumor, fibroma and fibromixoma [1]. Solitary fibrous tumors typically occur in the pleura, but they have also been found in the lung, mediastinum, pericardium, paranasal sinuses, peritoneum, and retroperitoneum [2]. They are considered generally benign, but 10% present cellular atypia, hypercellularity and necrosis, although these findings do not predict clinical aggressiveness. Since the evolution of this tumor is unpredictable, long-term follow up is recommended in these patients [3].

The plain film characteristics of solitary fibrous tumor of the retroperitoneum have been described in a single case as a soft tissue mass with a calcification [4]. The US and CT findings of this entity, also described in one case, report a mass enveloping the kidney and simulating a renal mass, with solid, hyperechogenic features on US and strong contrast uptake on CT [5]. MRI of solitary fibrous tumor of the retroperitoneum demonstrated a signal isointense to muscle on T1-weighted sequences, a heterogeneous hypointense signal on T2 sequences and significant uptake after gadolinium injection [4]. Thus, the radiologic characteristics of solitary fibrous tumor of the retroperitoneum, both the case presented and the two published cases containing this information are very similar to those described for this tumor in a pleural location [6,7]. The heterogeneous appearance of the tumor on T2 sequences has been attributed to variations in the proportion of its histologic components (that is, the amount of collagen and fibroblasts), as well as to the presence or not of degeneration [6].

The multiplanar capability of MRI and the possibility to perform dynamic sequences with gadolinium enhancement and angiographic reconstructions were useful for determining the exact location of the intra-abdominal mass in this case. This imaging method is superior to US and helical CT for obtaining tissue contrast and better characterization of primary retroperitoneal masses, which have a non-specific radiologic appearance. MR T2-weighted sequences are particularly useful for determining the fibrous
and hypocellular component of the tumor, manifested by a low signal, which contrasts with the hyperintensity seen in mixoid degeneration or necrosis when using these sequences [8]. This capacity narrows the extensive differential diagnosis of primary retroperitoneal mass to those showing hypointensity on T2 and presenting calcifications, a group that mainly includes germinal tumors, neurogenic tumors, fibrohistiocytoma and chondroid tumors. Thus, although solitary fibrous tumor infrequently occurs in the retroperitoneum, it should be included within this differential diagnosis.

4. Summary

Solitary fibrous tumor is an uncommon, usually asymptomatic neoplasm of probable mesenchymal origin affecting adults and typically located in the pleura. We present the case of a woman with fibrous solitary tumor originating in the retroperitoneum. Abdominal plain films showed a $3 \times 3.5$-cm homogeneous calcification with well-defined margins projecting over the sacrum. On abdominal US a solid, echogenic $5 \times 6$-cm mass, showing vascularization on Doppler, was seen in the hypogastrium. It extended from the anterior abdominal wall to the sacrum. Abdominal helical CT demonstrated a mass with an attenuation coefficient similar to muscle and a right posterolateral peripheral calcification. After iodinated contrast injection, the mass demonstrated significant enhancement in the portal phase except for several small areas of slight enhancement. Abdominal MRI demonstrated a mass isointense to muscle on T1-weighted sequences, and an heterogeneous, but predominantly hypointense signal was seen on T2-weighted sequences. In the dynamic study, the tumor enhanced strongly after intravenous gadolinium administration except for several small areas. Angiographic reconstructions showed displacement of the right iliac artery, which took on an anterior course around the mass. These imaging characteristics of solitary fibrous tumor of the retroperitoneum are very similar to those described for this tumor in a pleural site: analysis of a serie. Histopathology 1991;19:515–22.

References


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