Hepatic metastases of hemangiopericytoma: contrast-enhanced MRI, contrast-enhanced ultrasonography and angiography findings

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Abstract

Hemangiopericytoma is a rare and characteristically hypervascular tumour. We report a case of hepatic metastases of hemangiopericytoma for which there was correlative imaging by ultrasonography, ultrasonography with second-generation contrast agent (BR1), computed tomography, gadolinium-enhanced, Gd-BOPTA-enhanced and ferumoxides-enhanced magnetic resonance, and angiography. To our knowledge, this is the first reported case in which all these modalities were used in the diagnostic evaluation.

Keywords: Hemangiopericytoma; hepatic metastases; contrast-enhanced MRI; contrast-enhanced ultrasonography; angiography.

Introduction

Hemangiopericytoma is an unusual highly vascular soft tissue sarcoma of pericytic origin that commonly affects adults in the fifth or sixth decade of life[1,2]. Complete surgical removal is the treatment of choice for primary tumour, local recurrence and solitary metastasis[3,4]. Computed tomography (CT), magnetic resonance imaging (MRI) and angiography are classically considered the diagnostic modalities of choice for preoperative evaluation and surgical planning[5,6]. Recently, contrast-enhanced MRI has emerged as a valuable non-invasive technique which provides a rich analysis of the regional vascular properties of a tumour[7,8]. Ultrasonography (US) with the use of second-generation contrast agent has the potential to increase the detection of hypervascular tumours[9]. We describe the CT, contrast-enhanced MRI, US with second-generation contrast agent, and angiography findings in a patient with hepatic metastases of hemangiopericytoma.

Case report

A 57-year-old man presented with a 1 month history of slowly progressive mild right upper abdominal pain and weakness. The patient had been treated with radical surgery and adjuvant chemotherapy for a retroperitoneal hemangiopericytoma 3 years earlier. Six months before his current physician visit, a pelvic disease recurrence with one liver metastasis occurred. The radical excision of these two tumour lesions was performed without evidence of disease in the follow-up. The findings at physical examination were normal. Laboratory studies were not significant.

The patient underwent multiphase helical CT with a bolus of 120 mL of low-osmolar iodinated contrast medium (Iomeron 400 [iomeprol], Bracco, Milan, Italy) revealing a single mass in the left lobe (Fig. 1(a)). Dynamic contrast-enhanced MRI was performed using gadobenate dimeglumine (Gd-BOPTA) (MultiHance, Bracco, Milan, Italy)[10]. All images were obtained...
Figure 1  A 57-year-old man with hepatic metastases of retroperitoneal hemangiopericytoma. (a) Contrast-enhanced CT reveals a mass in the left lobe. (b) T1-weighted MR image at baseline shows a mass in the left lobe. (c) Gd-BOPTA-enhanced axial T1-weighted MR image in the dynamic phase shows homogeneous enhancement of the left lobe liver lesion with multiple signal flow voids representing large tumour vessels. (d) The corresponding image of Gd-BOPTA in the delayed phase shows the wash-out of contrast agent from the metastasis with delineation. (e) T2-weighted MR image before ferumoxides. (f) Ferumoxides-enhanced axial spin-echo T2-weighted MR image reveals lesion to have homogeneously increased signal. Prominent signal voids correspond to enlarged vessels. (g) Angiography shows three tumour lesions (arrows) and demonstrates increase in the size and number of feeding arteries and a profusion of draining veins. (h) Unenhanced US scan of the liver with detection of multiple hypoechoic lesions (arrow indicates the one highlighted in this image). (i) Following BR1 administration, in the same scan of (h), the metastasis is clearly depicted and appears hyperechoic in the arterial phase (arrow). (j) In the portal venous phase, the lesion shows a central hypoechoic area with peripheral hyperechoic ring (arrow). (k) In the delayed phase, the lesion appears hypoechoic (arrow).
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Discussion

Among sarcomas, the most distinctive and consistent feature of hemangiopericytoma is its hypervascularity[3,1]. The consensus of the literature is to treat all resectable tumour lesions, including local recurrences and a solitary metastasis, with wide excision[3,4]. Imaging plays an extremely important role in the appropriate treatment planning by demonstrating the vascular nature of the tumour, revealing the exact source of its blood supply, and, finally, demonstrating its size[12,13]. Increased sensitivity of new diagnostic imaging modalities in the detection and characterization of liver metastases has created a need for detailed understanding of the pathological-radiological relationship of each type of tumour. This endeavour is made difficult by the rarity of some of these tumours.

MRI and angiography are often used for evaluating hemangiopericytomas[5]. In the reported case, angiography added further information about the number and calibre of arteries feeding and veins draining the liver metastases. US with BR1 showed detection results similar to those of Gd-BOPTA and ferumoxides-enhanced MRI and angiography. To the best of our knowledge, MRI with Gd-BOPTA and ferumoxides, and US with BR1 findings of hepatic metastases of hemangiopericytoma have not previously been reported.

Hemangiopericytomas occur most frequently in the extremities, and the retroperitoneum is the second most common site. Patients with hemangiopericytoma can experience either early or late local recurrences and distal haematogenous metastases. The most frequent sites of metastases are lung, liver and bone. The prognosis for these patients is very variable, and less than 50% are disease-free at 5 years. Recurrences can develop following an extended disease-free interval with nearly 50% of recurrences occurring at 3 or more years after diagnosis and reported cases relapsing after 20 years[1,4]. Radical surgery remains the mainstay of therapy. Therefore, the early detection of locoregional and distant recurrence can play an effective role in the prognosis of these patients. A careful long-term follow-up is mandatory for these patients.

Multidetector computed tomography (MDCT) is the modality of choice for follow-up imaging, in particular with regard to lung metastases, the lung being a frequent site of metastases of hemangiopericytoma[14]. Contrast-enhanced MRI with Gd-BOPTA or ferumoxides and US with BR1 can be used for supplementary liver imaging. US with BR1 is an upcoming way to illustrate liver lesions in various vascular phases, and has some advantages over other modalities for imaging of liver metastases, such as convenience, the probability of fewer side-effects, no exposure to radiation, and no risk of missing the optimal time for observation[9].
Hepatic metastases of hemangiopericytoma

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