Annals of Nuclear Medicine Vol. 7, No. 1, 57–60, 1993

Tc-99m-methylene diphosphonate (Tc-99m MDP) and Ga-67 concentration in soft tissue malignant fibrous histiocytoma (MFH): Case report

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A case of calcifying soft tissue malignant fibrous histiocytoma (MFH) which showed a concentration of Tc-99m MDP and Ga-67 citrate, is presented. Tc-99m MDP and Ga-67 citrate scintigraphies of the thigh mass were correlated with conventional radiography, computed tomography (CT) and angiography.

Key words: malignant fibrous histiocytoma, Tc-99m-MDP, Ga-67-citrate, computed tomography, angiography

INTRODUCTION

NUMEROUS REPORTS in recent years have clearly established malignant fibrous histiocytoma (MFH) as a discrete pathologic entity.[1–4] To the best of our knowledge, only a single case report of the bone and Ga-67 citrate scan findings of MFH has been published.[4] Therefore, this case presents an additional example of concentrations of Tc-99m methylene diphosphonate (Tc-99m MDP) and Ga-67 citrate in MFH.

In this paper, both Tc-99m MDP and Ga-67 citrate scintigraphy of the thigh mass are also correlated with conventional radiography, computed tomography (CT) and angiography.

CASE REPORT

A 66-year-old woman presented with a six month history of an enlarging painful left thigh mass. There was no associated weight loss, fatigue, or fever. Upon physical examination, a tender, firm, walnut-sized (3 × 5 cm), oval-shaped mass was found to be present medially in the middle of the left thigh. There were no overlying skin changes or local adenopathy.

The conventional radiogaph of the left thigh showed only a soft tissue mass displacing the fat planes. A small, poorly defined area of calcifications was observed within the tumor mass (Fig. 1). There was no involvement of the underlying femur. The chest radiograph was normal.

A Tc-99m MDP image showed intensely increased radiopharmaceutical accumulation in the mass, with the underlying femur having a normal scintigraphic appearance (Fig. 2). The remainder of the soft tissues and all of the osseous structures were normal on the whole body bone scan (Fig. 3). The Ga-67 scan demonstrated an ill-defined, moderately intensive accumulation in the mass (Fig. 4).

Computed tomography demonstrated a clear delineation of the size and extent of the mass without any involvement of bone and its internal structure. The soft tissue mass had an attenuation coefficient which was similar to that of muscle. Calcifications were present in the mass (Fig. 5).

Angiography revealed the mass to be supplied with blood by branches from the femoral artery, which was displaced and partially narrowed (Fig. 6).

Received August 12, 1992, revision accepted September 28, 1992.

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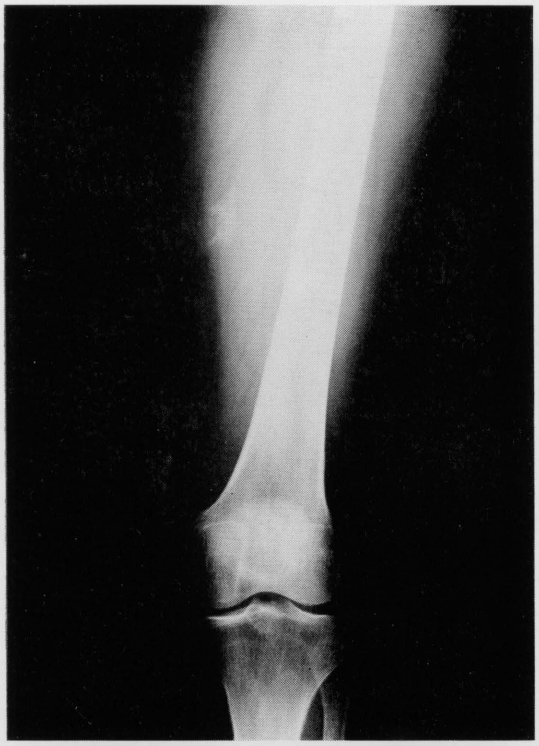

Fig. 1 Antero-posterior plain radiograph of the left thigh. There is a large soft tissue mass medial to the femur, with intrinsic calcifications and without underlying osseous involvement.

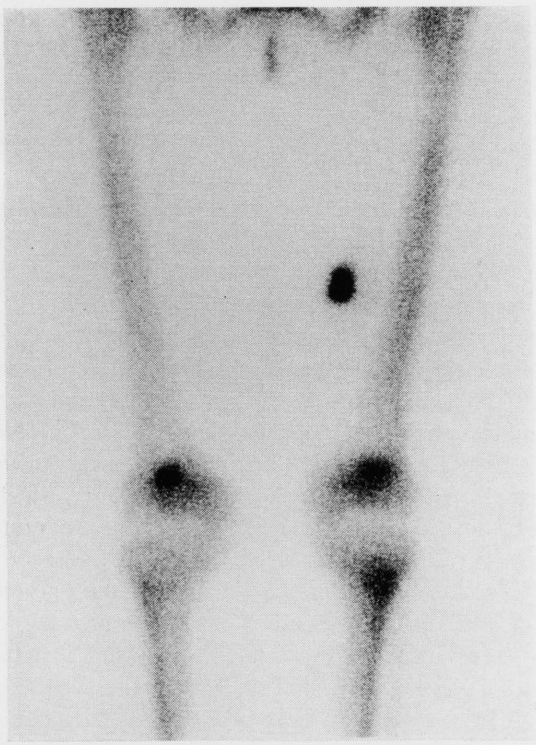

Fig. 2 Anterior view of both thighs, supine. Tc-99m MDP two hour delayed image demonstrates intense uptake in the mass. The underlying femur has a normal scintigraphic appearance.

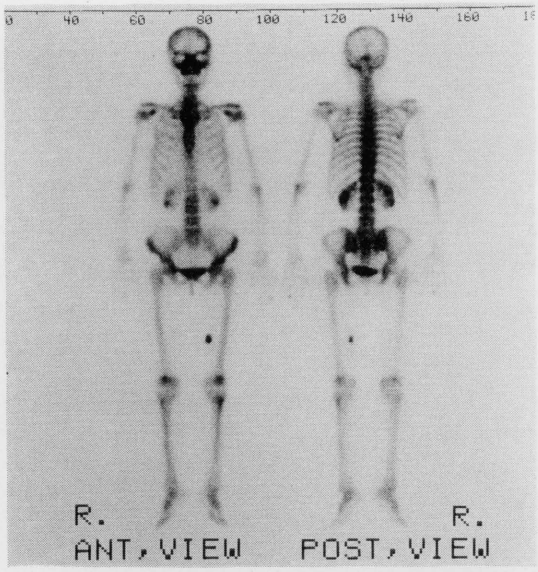

Fig. 3 Whole body bone scan. The remainder of the soft tissues and all of the osseous structures except for the soft tissue mass in the left thigh were normal.

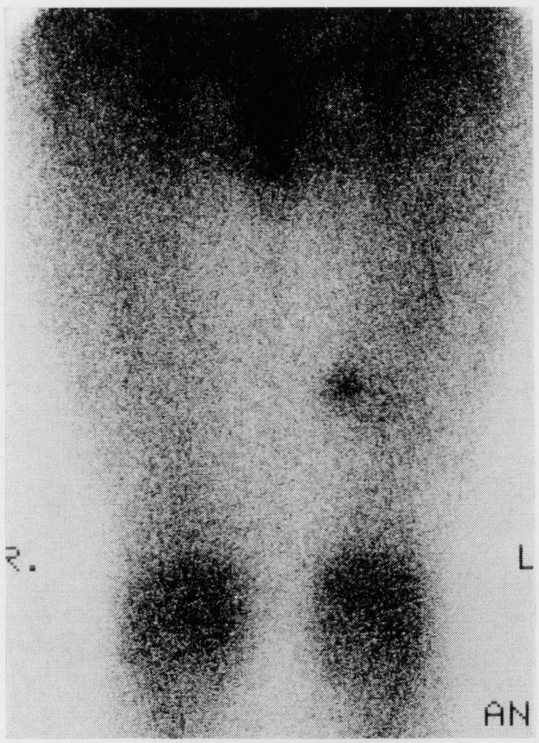

Fig. 4 Anterior view of both thighs, supine. Ga-67 citrate 48 hour delayed image shows moderately intense uptake in the mass. The size, appearance, and location of the abnormality closely match the bone scan findings.

Numerous fine tumor vessels entered the mass and there was inhomogeneous intense capillary staining. The patient was treated with a wide en bloc local excision of the mass and reconstruction of femoral artery with vein graft.

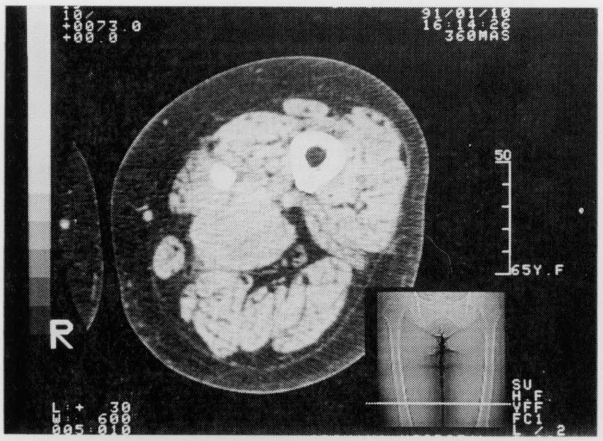

Fig. 5 Axial computed tomography scan, 1 cm thick section, at level of the left thigh mass. The well circumscribed mass with calcification located anteromedially within the soft tissues of the thigh has an attenuation coefficient approximately equal to muscle tissue. No bony involvement is detected in the femur.

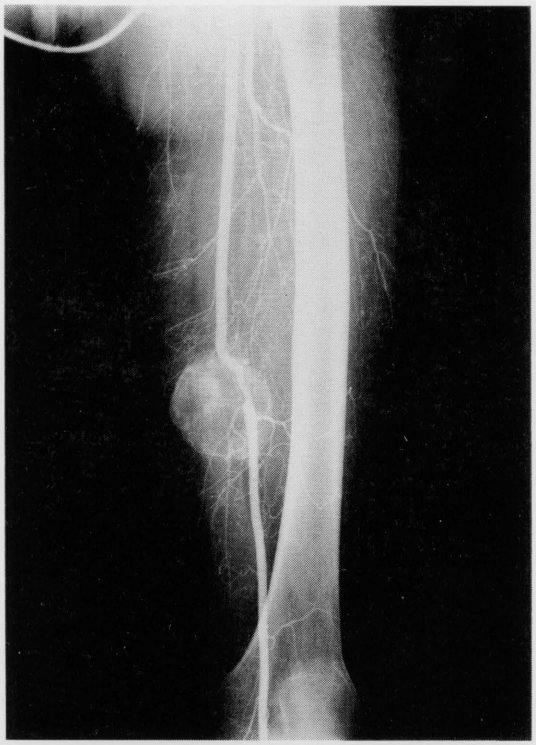

Fig. 6 Percutaneous femoral arteriogram of the left thigh. Several branches from the femoral artery laterally displaced and partially narrowed supply the mass with numerous fine tumor vessels. There are regions of intense capillary staining.

The gross pathologic examination revealed a well circumscribed margin with irregular central calcification (Fig. 7).

The microscopic findings were diagnostic of MFH.

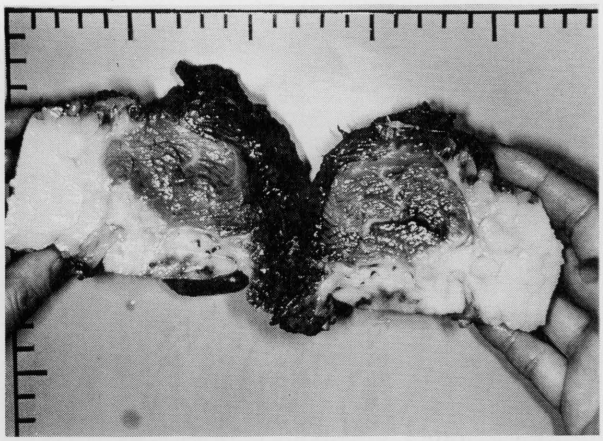

Fig. 7 Cut surface of skin and skeletal muscle revealing a tumor that is fairly well circumscribed by a glistening fibrous gray capsule. The tumor is multilobulated has, a firm gray white surface, and has focal areas of hemorrhage and necrosis.

DISCUSSION

Malignant fibrous histiocytoma (MFH) is a soft tissue sarcoma of undifferentiated mesenchymal cell origin[2] and is considered the most common soft tissue sarcoma in adults.[3] It commonly occurs in the 5th and 6th decades with a 2: 1 male to female predominance. It most frequently occurs on the extremities and in the retroperitoneum, arising in the deep fascia or in the skeletal muscle. Approximately one third of all cases occur in the thigh, as illustrated in this case report. However, MFH has the potential of arising in any organ because of the ubiquitous presence of mesenchimal tissue.[5]

The imaging characteristics of MFH are typically nonspecific.[8–11]

In conventional radiography, MFH in the soft tissues appears as a nonspecific mass, usually measuring more than 5 cm in diameter.[2] According to Mackey et al., none of their patients with FMH exhibited calcium deposition within the soft tissue mass and adjacent osseous involvement.[4] However, tumor masses containing punctate calcifications have been observed by others.[6] In our case, poorly defined calcifications were also seen within the tumor (Fig. 1).

Both Tc-99m MDP and Ga-67 citrate scanning demonstrate intense accumulation of the radiopharmaceuticals in the tumor (Figs. 2, 4). There is no satisfactory explanation for the accumulation of both Tc-99m MDP and Ga-67 citrate. A variety of hypotheses[5,7,8] have been invoked to explain the accumulation of these radiopharmaceuticals, but none of these has been definitely proved or disproved.

In computed tomography, MFH is a predominantly dense muscle (Fig. 4). The attenuation coeffi-

cient is similar to that of muscle tissue and does not contain negative values, this being a point of difference from liposarcomas.[9]

The angiographic features of MFH are those of marked hypervascularity and early venous return (Fig. 6) and demonstrate fine, corkscrew-like tumor vessels with delayed emptying.[10]

Treatment for MFH is complete surgical removal by wide local excision. Operative planning requires a knowledge of the precise local extent, size and depth of the muscle and deep fascia, the location of its major feeding vessels, and the presence or absence of metastatic disease. Radioisotope scintigraphy, CT and angiography are techniques that can assist in planning the operation. Spatial resolution of bone and Ga-67 scintigraphies is certainly inferior to those of CT and angiography. However, we believe bone and Ga-67 scintigraphies are useful in the preoperative evaluation of patients with MFH, since detection of coexisting silent lesions is clearly important in planning treatment. Furthermore, we advocate the use of bone and Ga-67 scintigraphies for follow-up.

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