

Tc-99m MIBI imaging in malignant fibrous histiocytoma

Cumali AKTOLUN,* Fatma BERK,* Hakan DEMİR* and Cengiz ERCİN*

*Departments of *Nuclear Medicine and **Pathology,
Kocaeli University School of Medicine, Kocaeli, Turkey*

The authors report a case of malignant fibrous histiocytoma of the left forearm demonstrated by Tc-99m MIBI imaging. The tumor originated in the soft tissue of the forearm; no obvious bone invasion or metastasis was detected scintigraphically or radiologically.

Key words: malignant fibrous histiocytoma, Tc-99m MIBI, Tc-99m MDP bone scan

INTRODUCTION

MALIGNANT FIBROUS HISTIOCYTOMA (MFH) is considered to be one of the most common soft tissue sarcomas in adults. It can arise in the structures supporting the various organs. This tumor manifests a broad range of histological appearances. Depending on the histological type, the tumor may appear well differentiated or highly anaplastic.¹ Various radionuclides, especially gallium-67 and Tc-99m MDP have been utilized in the diagnosis and follow-up of primary and metastatic MFH.²⁻⁷ Tc-99m MIBI is now commonly used for tumor imaging.⁸⁻¹¹ The use of Tc-99m MIBI for the assessment of p-glycoprotein expression in the evaluation of tumor response in patients with soft tissue tumors including MFH which was previously reported.¹² In this report; we present a case of MFH in the left forearm showing Tc-99m MIBI uptake.

CASE REPORT

A 71-year-old woman had a soft tissue mass (7 × 5 × 4 cm) in her left forearm for 2 months. The patient was assessed by radiologic methods (X-ray, CT and MRI) and no bone invasion or metastases were found. The patient was then evaluated scintigraphically for evaluation of the primary tumor, bone invasion and distant metastasis. Three-phase bone scan and Tc-99m MIBI tumor imaging were per-

formed on two separate days. Dynamic and blood pool images after three hours of injection of Tc-99m MDP were acquired. No local bone invasion or distant metastases were detected on the bone scan. Two days later the patient was injected with 740 MBq Tc-99m MIBI. Imaging started 20 minutes after the injection. Early and delayed static spot images of 1000 Kcounts in both forearms and the whole body in anterior and posterior projections were obtained. There was prominent Tc-99m MIBI uptake in the mass in the left forearm strongly suggesting a malignant nature (Fig. 1). No other pathologic uptake was seen on bone scan images (Fig. 2). After radiologic and scintigraphic studies, the mass was surgically removed and giant cell MFH was diagnosed histopathologically (Fig. 3).

DISCUSSION

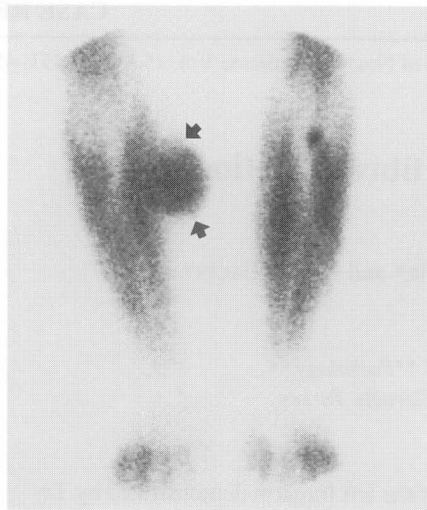
The MFH is characteristically a tumor of late adult life with the majority of cases occurring in persons between the ages of 50 and 70. There are 5 subtypes. These are storiform-pleomorphic, myxoid, giant cell, inflammatory and angiomatoid.¹ Due to the histological subtypes of the tumor, the recurrence rate and metastatic rate vary greatly. The histological subtype in our patient was giant cell MFH. Both the metastatic and recurrence rates for this tumor are 50%.¹ The evaluation of the extent of the tumor is very important for proper treatment planning. Therefore the extent of the tumor should be evaluated by reliable methods.

Several tumor seeking radiopharmaceuticals have been used for the evaluation of MFH. Gallium-67 has been used frequently in MFH because histiocytes have

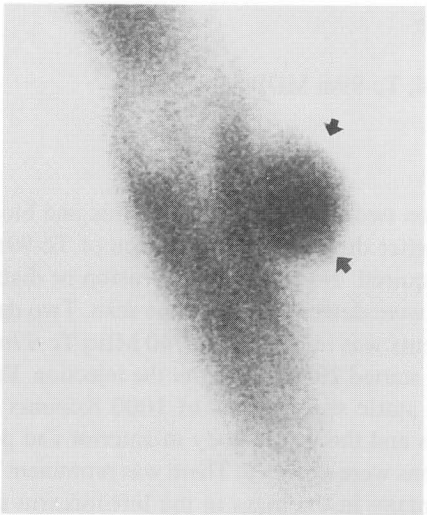
Received April 12, 2001, revision accepted June 20, 2001.

For reprint contact: Cumali Aktolun, M.D., M.Sc., Nuclear Medicine Department, Kocaeli University Medical School, Derince, Kocaeli, TR-41900, TURKEY.

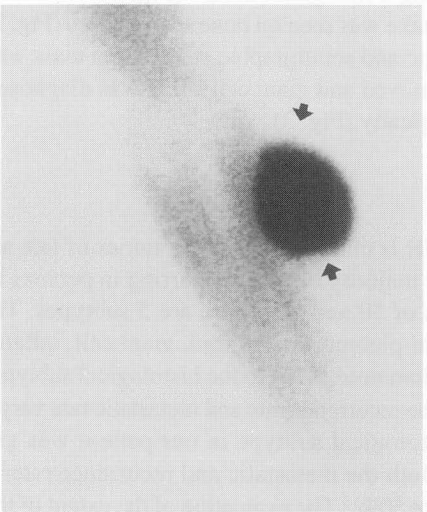
E-mail: aktolun@hotmail.com



A



B



C

Fig. 1 Marked Tc-99m MIBI uptake in primary malignant fibrous histiocytoma originating from the left forearm: posterior image taken 10 minutes following injection of Tc-99m MIBI (A), lateral image taken 30 minutes after injection (B), and delayed lateral image taken 2.5 hours after injection (C). Note the improved image-to-background contrast on delayed image.

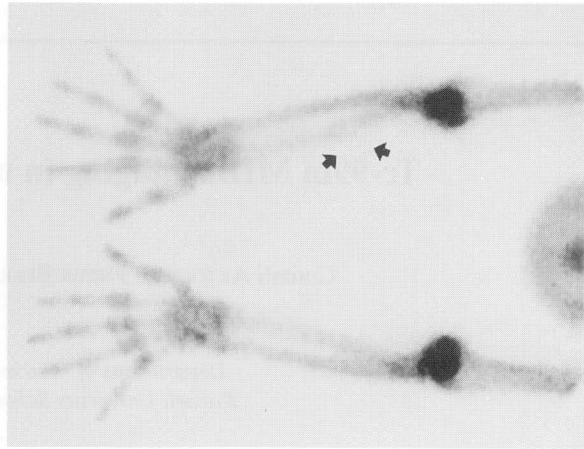


Fig. 2 Bone scan (anterior) performed 3 hours after injection of Tc-99m MDP. There is no pathologic uptake in the left forearm and the other parts of the body. Arrows show the area of interest where increased uptake of Tc-99m MIBI was detected as seen in Figure 1.

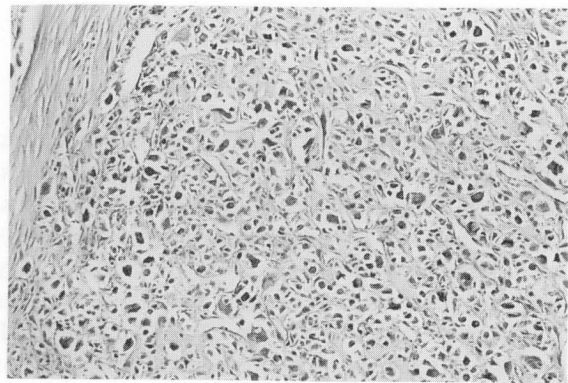


Fig. 3 Photomicrograph of the pathologic specimen showing multinuclear osteoclastic giant tumor cells and fusiform cells in a storiform organization on eosinophilic background (HE \times 100).

abundant lysosomes, and gallium-67 imaging has found 93.3% of primary tumors and 100% of metastases.² It has been found useful for all MFHs originating in the various organs.²⁻⁵ Tc-99m MDP has been used frequently in MFH and it is found useful for the evaluation of the primary MFH originating in the bone tissue, local bone invasion and its bone metastases.^{2,5,6} Although bone metastases are generally hot on Tc-99m MDP bone scan, due to the osteoclastic nature of the tumor, cold defects may also be seen.⁷ Soft tissue MFHs have been reported to show Tc-99m MDP accumulation due to the calcification or iron content of the tumor.^{13,14} Bone scan is not reliable for the detection of soft tissue MFH but thallium-201 was used in the evaluation of primary and metastatic MFH.¹⁵⁻¹⁸

Tc-99m MIBI is used for clinical trials in various

tumors. Considering its advantages over gallium-67 and thallium-201, we used Tc-99m MIBI for the evaluation of the mass in the left forearm of our patient before surgery. There was prominent uptake in the mass and no distant metastases on Tc-99m MIBI images. This raised the possibility of the malignant nature of the tumor, and Tc-99m MDP bone scan showed the absence of local invasion to bony structures and distant bone metastases. From this experience, it seems that using both Tc-99m MDP and Tc-99m MIBI together is useful in the pre-surgical evaluation of MFH.

ACKNOWLEDGMENT

The images were kindly provided by Ultra-tek Medical Diagnostic Imaging Center, Kocaeli, Turkey.

REFERENCES

- Enginger ME, Weiss SW. Malignant fibrohistiocytic tumors. In: *Soft Tissue Tumors*. Enzinger ME, Weiss SW (eds), St. Louis; Mosby, Inc., 1998: 373–375.
- Aktolun C, Bayhan H, Kir M. Clinical experience with Tc-99m MIBI imaging in patients with malignant tumors. Preliminary results and comparison with Tl-201. *Clin Nucl Med* 1992; 17: 171–176.
- Aktolun C, Bayhan H, Pabuccu Y, Bilgic H, Acar H, Koylu R. Assessment of tumor necrosis and detection of mediastinal lymph node metastasis in bronchial carcinoma with Tc-99m sestamibi imaging: comparison with CT scan. *Eur J Nucl Med* 1994; 21: 973–976.
- Aktolun C, Bayhan H, Ozturk E. Better visualisation of retinoblastoma metastases with Tc-99m SestaMibi versus Tl-201. *Clin Nucl Med* 1995; 20: 446–468.
- Aktolun C. Tc-99m sestamibi imaging in breast cancer: an alternative to Tl-201 imaging. *J Nucl Med* 1994; 35: 2055–2056.
- Lin WY, Kao CH, Hsu CY, Liao SQ, Wag SJ, Yeh SH. The role of Tc-99m MDP and Ga-67 imaging in the clinical evaluation of Malignant fibrous histiocytoma. *Clin Nucl Med* 1994; 19: 996–1000.
- Harrowe DJ, Kessler S, Jansen AA, Larson SM. Gallium-67 uptake by a malignant fibrous histiocytoma: Case Report. *J Nucl Med* 1976; 17: 630–632.
- Zazzaro PF, Bosworth JE, Schneider V, Zelenah JJ. Gallium scanning in malignant fibrous histiocytoma. *Am J Roentgenol* 1980; 135: 775–779.
- Mackey JK, Jackson BA, Fetters DV, Edwards SM, McBride JP, Cole RL, et al. Bone and Gallium scan findings in malignant fibrous histiocytoma. Case report with radiographic and pathologic correlation. *Clin Nucl Med* 1987; 12: 17–21.
- Stemerman DH. The appearance of malignant fibrous histiocytoma on a three-phase bone scan. *Clin Nucl Med* 1996; 21: 398–399.
- Sanders TG, Wilf LH, Northup HM. Case Report: Malignant fibrous histiocytoma: etiology for a cold defect on Tc-99m MDP scan. *J Nucl Med* 1990; 31: 1104–1105.
- Taki J, Sumiya H, Asada N, Ueda Y, Tsuchiya H, Tonami N. Assessment of p-glycoprotein in patients with malignant bone and soft-tissue tumors using technetium-99m-MIBI scintigraphy. *J Nucl Med* 1998; 39: 1179–1184.
- Spencer RP, Evans DD, Forouhar F, Fetters DV, Yeh SD. Tc-99m diphosphonate uptake in malignant fibrous histiocytoma: a possible iron-related effect. *Clin Nucl Med* 1988; 13: 734–735.
- Rosenthal C. Tc-99m methylenediphosphonate concentration in soft tissue malignant fibrous histiocytoma. *Clin Nucl Med* 1978; 3: 58–61.
- Tonami N, Itoh K, Yui N, Terusi S, Torizuka K. Clinical usefulness of thallium-201 chloride in the diagnosis of tumor (II): an evaluation in bone, soft tissue and mediastinal tumors. *KAKU IGAKU (Jpn J Nucl Med)* 1994; 31: 63–74.
- Hayashi Y, Kimura N, Bandoh Y, Fujimoto N, Kohyama Y, Kumagai H. Intracerebral malignant fibrous histiocytoma with increased uptake on Tl-201 image. *Clin Nucl Med* 1996; 21: 1007.
- Sumiya H, Taki J, Tsuchiya H, Nonomura A, Miyauchi T, Tonami N. Midcourse thallium-201 scintigraphy to predict tumor response in bone and soft-tissue tumors. *J Nucl Med* 1998; 39: 1600–1604.
- Sumiya H, Taki J, Tonami N, Asada N, Tsuchiya H, Tomita K. Evaluation of bone and soft tissue lesion using ^{99m}Tc-MIBI: comparison with ²⁰¹Tl and the relation to chemotherapeutic effect. *KAKU IGAKU (Jpn J Nucl Med)* 1997; 34: 105–111.