

Gallium-67 uptake in fibrous dysplasia of the bone

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In a 43-year-old woman with fibrous dysplasia of the ribs and facial bone and in a 40-year-old man with fibrous dysplasia of the facial bone, there were considerable increases in the uptake of Tc-99m methylenediphosphonate (Tc-99m MDP) and Gallium-67 citrate. Fibrous dysplasia should be added to differential diagnosis of high Gallium-67 citrate uptake in the bone lesions.

Key words: Fibrous dysplasia, Gallium-67 scintigraphy, Bone scintigraphy

INTRODUCTION

UPTAKE of Tc-99m MDP in a fibrous dysplasia of the bone has been well documented.¹⁻⁴ However, only one case of the uptake of Gallium-67 citrate in these lesions has been reported.⁴ We report here that in two patients with fibrous dysplasia of bone the uptake of Tc-99m MDP and Ga-67 citrate was significant.

CASE REPORTS

CASE 1

A 43-year-old woman was admitted to our hospital because of abnormal shadows in the ribs, detected at the time of a mass screening chest X-ray. There were no subjective complaints. Physical examination revealed swelling of the left facial bone but no tenderness. Radiography of the ribs showed multiple osteoblastic and cystic lesions with no periosteal reaction in the right fifth rib and left fourth and fifth ribs. Radiography of the skull showed sclerosis and hyperplasia of the left maxillary bone (Fig. 1). Bone scintigraphy was performed with a gamma camera (OMEGA 500, Technicare), equipped with a low energy collimator at four hours after intravenous

injection of 740 MBq (20 mCi) of Tc-99m MDP. Spot images revealed increased uptake of Tc-99m MDP in the area corresponding to the lesion shown on the radiography (Fig. 2a, b). Gallium scintigraphy performed 72 hours after the intravenous administration of 3 mCi of gallium-67 citrate using the same gamma camera equipped with a middle energy collimator, showed a moderate uptake in the lesions as well (Fig. 3a, b). A diagnosis of fibrous dysplasia was made by the biopsy of the right fifth rib.

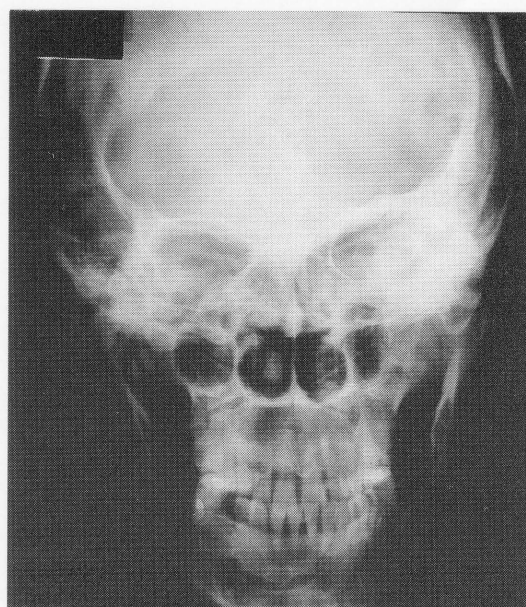


Fig. 1 Case 1. Radiography of the skull showed sclerosis and hyperplasia of the left facial bone.

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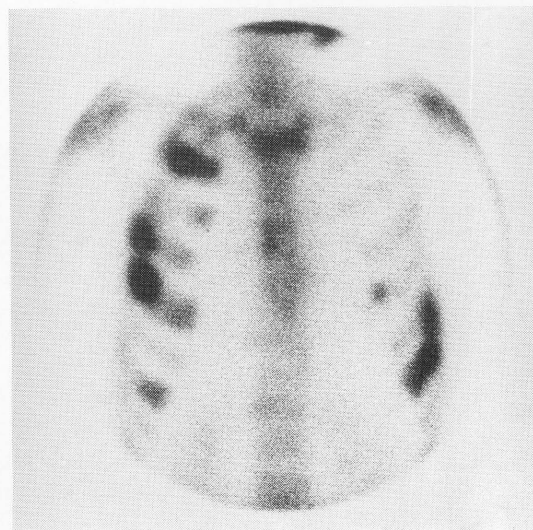


Fig. 2a, b Spot images of the head (A) and the chest (B) in bone scintigraphy performed at four hours after intravenous injection of 20 mCi of Tc-99m MDP revealed increased uptake of Tc-99m MDP in the area corresponding to the lesion shown in the radiograph.

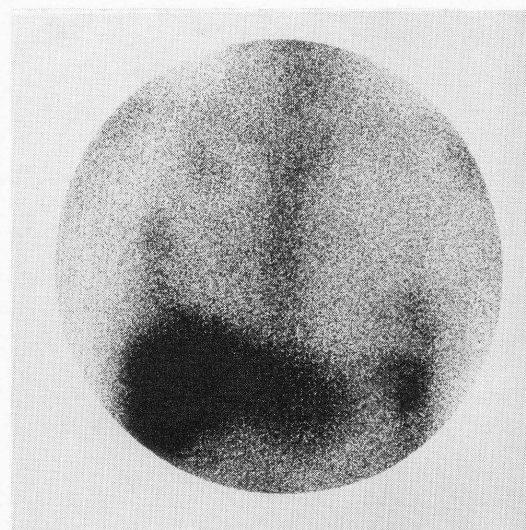
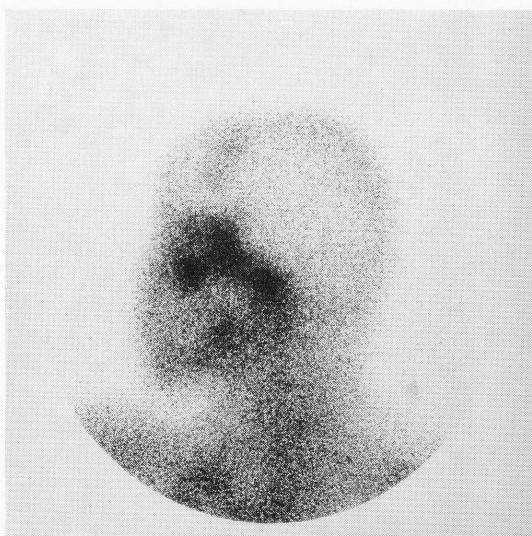


Fig. 3a, b The head (A) and the chest (B) of gallium scintigraphy performed 72 hours after the intravenous administration of 3 mCi of gallium-67 citrate showed a moderate uptake in the lesions.

CASE 2

A 40-year-old man referred to our hospital, complaining of erosion and swelling of the left hard palate in the mouth. Physical examination revealed swelling of the left facial bone and the erosion and swelling of the left hard palate in the mouth but no tenderness. Computed tomography (CT) of the maxillary bone showed sclerosis and hyperplasia of the left maxillary bone (Fig. 4). Bone and gallium scintigraphies were performed by the same methods as for case 1. Spot image of bone scintigraphy revealed increased uptake of Tc-99m MDP in the area corresponding to the lesion shown on the CT (Fig. 5). Gallium scinti-

graphy showed a high uptake in the lesions as well (Fig. 6). A diagnosis of fibrous dysplasia was made by the biopsy of the hard palate.

DISCUSSION

Fibrous dysplasia of the bone is a benign condition which commonly occurs in the first and second decades of life. Involvement of craniofacial bone is not rare. The maxilla is more commonly affected than the mandible, when the facial bones are involved.⁵

Bone scintigraphy is clinically used for detecting

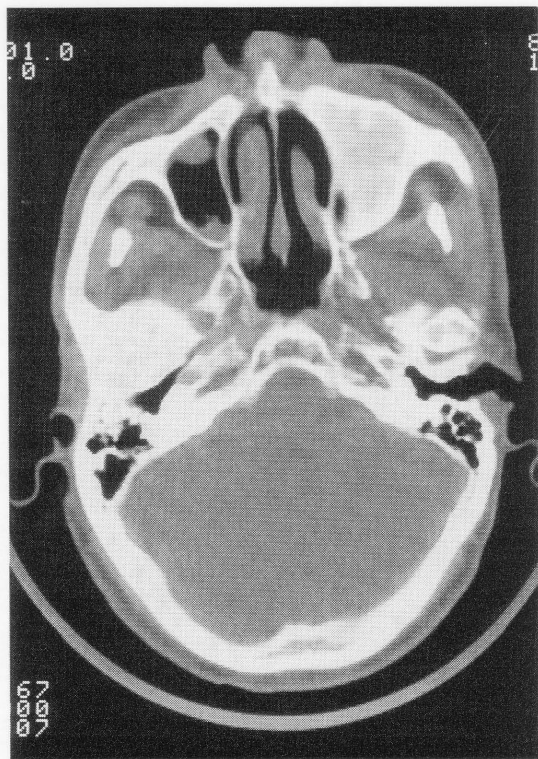


Fig. 4 Case 2. CT of the skull showed sclerosis and hyperplasia of the left facial bone with no periosteal reaction.



Fig. 5 Spot images of the head in bone scintigraphy showed increased uptake of Tc-99m MDP in the left maxillary sinus.

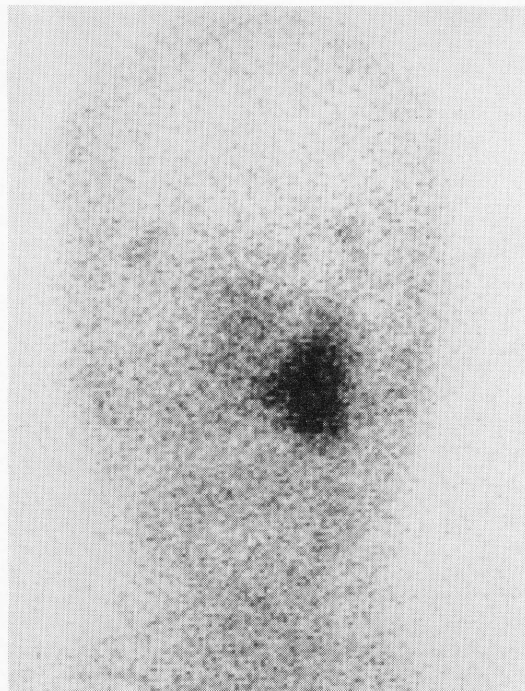


Fig. 6 Spot image of the head in gallium scintigraphy showed a high uptake in the lesion as well.

pathologic lesions in fibrous dysplasia.¹⁻⁴ The possible mechanisms related to the uptake of MDP in the bone are binding to hydroxyapatite which is a component of bone matrix and calcium deposits. High MDP uptake in the bone tumor and inflammation are due to increased metabolism which is the response of recovery from the disease. Bone scintigraphy is a sensitive imaging used in detecting the involvement in fibrous dysplasia.² Due to the increased vascularity of fibrous dysplasia, increased concentration of bone seeking radionuclides is seen both in early perfusion and delayed bone imaging.³

Gallium-67 citrate is clinically used for tumor imaging in various types and the lesion of inflammation.⁶⁻⁸ However, the uptake of Gallium-67 citrate of fibrous dysplastic lesions has been reported in only one case. While the exact mechanisms related to the uptake of Gallium-67 citrate in the tumor and inflammatory lesions are not well understood, possible mechanisms are increased vascularity, uptake by inflammatory and tumor cells and increased permeability of capillaries.⁶⁻⁸ One of mechanisms of high Gallium-67 citrate activity in the fibrous dysplastic lesions is presumably due to the increased vascularity of the lesions.

In our patient, both Tc-99m MDP and Gallium-67 citrate accumulated in the fibrous dysplastic lesions. Fibrous dysplasia should be added to differential diagnosis of high accumulation of Gallium-67 citrate in bone tumors, because of the high concentration of

Gallium-67 citrate in the fibrous dysplasia as well as malignant bone tumor.

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