Positive (^{99m}Tc) Diphosphonate and ^{67}Ga-Citrate Scans in Ameloblastoma: Case Report

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Technetium-99m-diphosphonate scintigrams and ^{67}Ga citrate bone scans were performed in a patient with known ameloblastoma of the right mandible. The tumor concentrated both radionuclides avidly. The lesion was larger on the gallium scans, presumably due to inflammation of adjacent soft tissue and to poorer instrument resolution for ^{67}Ga than for technetium. If a single radionuclide is to be selected for evaluating the extent of tumor in ameloblastoma, the bone-imaging agent is preferable.

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We recently had the opportunity to perform preoperative ^{99m}Tc-diphosphonate and ^{67}Ga citrate scans in a case of ameloblastoma of the right mandible. Review of the literature disclosed only one instance of scintillation imaging in ameloblastoma revealing local recurrence and metastatic foci by bone scan (*1*). However, there is a mention of a positive bone scan in ameloblastoma of the lower gum (*2*). The ^{99m}Tc-diphosphonate scan has been used in the preoperative evaluation of a radicular cyst, which is almost identical with ameloblastoma in radiographic appearance and behavior (*3*). The scans of this case of ameloblastoma with classic radiographic appearance and prominent uptake of ^{99m}Tc-diphosphonate and ^{67}Ga-citrate will be of value to the surgeon in selecting the margins of resection.

CASE REPORT

A cystic bone lesion was discovered incidentally in the right mandible of a 24-year-old white woman during routine dental work. Biopsy proved it to be an ameloblastoma and the patient was hospitalized for further study and treatment. X-rays of the mandible (Fig. 1) showed a sharply demarcated multiloculated radiolucent defect, measuring 2.3 × 4.2-cm, in the body of the right mandible. Bone scintigrams of the mandible were performed 4 hr after the intravenous administration of 15 mCi of ^{99m}Tc-diphosphonate. Imaging was done on a scintillation camera with a 140-keV high-resolution parallel-hole collimator. A 2.5 × 6-cm area of accelerated bone metabolism was seen in the right mandible in the region of the tumor (Fig. 2). Gallium-67 citrate scans were performed 72 hr after the intravenous administration of 5 mCi of the radionuclide, using a dual probe 5-in. rectilinear scanner. A 3 × 8-cm area of abnormal uptake was present in the right side of the mandible corresponding to the location of the tumor (Fig. 3).

The body of the right mandible was resected and

FIG. 1. Right lateral roentgenogram of mandible shows 2.3 × 4.2-cm multiloculated radiolucent defect with sclerotic margins.

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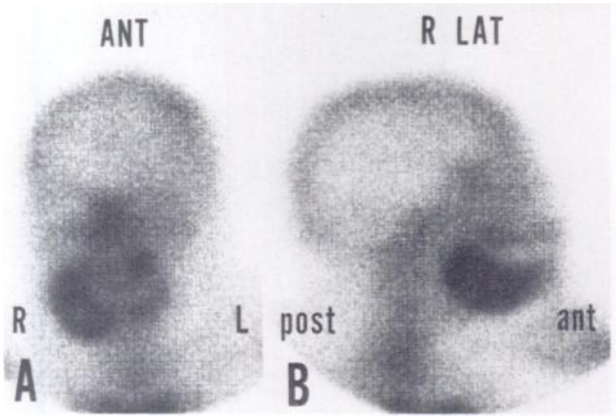

FIG. 2. Anterior (A) and right lateral (B) ^{99m}Tc-diphosphonate scintigrams of skull show 2.5 × 6-cm area of increased bone metabolism in right mandible.

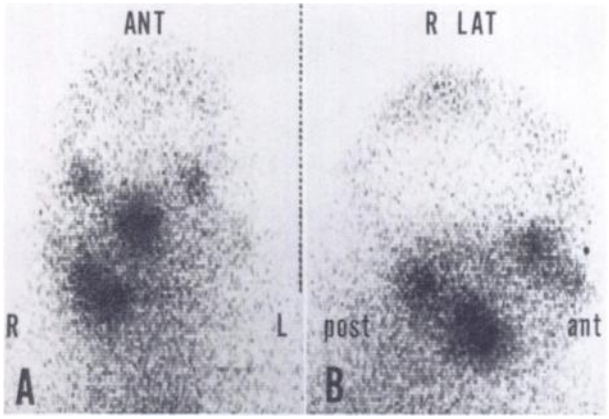

FIG. 3. Anterior (A) and right lateral (B) ^{67}Ga-citrate scans of head show 3 × 8-cm area of abnormally increased uptake in right mandible.

a tantalum splint and rib-bone graft were used to repair the defect. There was no microscopic evidence of tumor involvement of surrounding soft tissues or regional nodes.

DISCUSSION

Ameloblastoma of the jaw is an uncommon potentially malignant tumor of odontogenic origin, characterized by aggressive local invasiveness and marked tendency to recur. Metastasis is unusual and may be lymphogenous or hematogenous.

The most effective treatment appears to be early and adequate resection. Repeated surgical manipulations are too often the prelude to metastasis or uncontrolled local extension. The physician who treats the patient first has the best opportunity for an effective and lasting cure. So-called "radical" treatment by adequate excision proves ultimately to be "conservative" by sparing appearance, function, and life (*4*).

Gamma imaging of bone and soft tissue can be of assistance in defining the extent of the tumor for the surgeon who must plan for adequate surgical clearance. Physical examination is inaccurate in evaluating soft-tissue involvement and can be assisted by the soft-tissue scan. In ameloblastoma there is diffuse invasion of the cancellous spaces of the bone marrow by finger-like projections of tumor, and the bone scan may detect minimal osseous involvement before it becomes demonstrable radiographically.

Both ^{99m}Tc-diphosphonate and ^{67}Ga were well concentrated in the tumor. The larger size of the lesion, as delineated by ^{67}Ga, was attributed to inflammation of soft tissue adjacent to the tumor and to poorer instrument resolution for ^{67}Ga than ^{99m}Tc. The comparison is further complicated, however, by the recent report that increased concentration of ^{99m}Tc-diphosphonate may occur in surrounding tumor-free bone because of active disuse osteoporosis or hyperemia (*5*).

We believe that, if a single radionuclide is to be used for evaluating the extent of tumor present in ameloblastoma, the bone-imaging agent is preferable.

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