

POLYPHOSPHATE BONE SCANS, ^{32}P PHOSPHORUS, AND ADENOCARCINOMA OF THE THYROID

Lazard Klinger

Lafayette General Hospital, Lafayette, Louisiana

A patient with thyroid adenocarcinoma which did not concentrate radioiodine was treated with ^{32}P for relief of bone pain.

Radioiodine therapy may be offered to patients with thyroid carcinoma only if there is demonstrable uptake in metastases. A patient in whom radioiodine uptake in bony metastases could not be demonstrated was treated with ^{32}P for bone pain.

This is the case of a 68-year-old white woman with diffuse osteoblastic and occasional osteolytic bone metastases complicated by a compression fracture of D12. In the search for a primary malignancy, a sternal marrow puncture was done after other studies including mammograms were found to be negative. This was reported to be metastatic papillary carcinoma to bone marrow. The pathologist thought it was most likely thyroidal in origin.

On January 24, 1973 the referring physician decided an abdominal exploration was in order to rule out ovarian pathology. The abdomen was free of malignancy. After closing the abdomen, a normal-appearing thyroid was removed. Histologic examination revealed multicentric areas of well-differentiated adenocarcinoma of mixed papillary and follicular type with vascular invasion.

The patient was then referred for evaluation regarding radioiodine therapy. A baseline scan on February 1, 1973 using 100 μCi of ^{131}I failed to show a discrete area of activity in the neck with 24-hr uptake of 1.4%. She was then given an ablation dose of 50 mCi ^{131}I .

A scan on March 22, 1973 following 10 units of TSH daily for 3 consecutive days with 5 mCi ^{131}I (1) showed uptake in the midline of the neck as well as in the salivary glands, stomach, right colon, and bladder (Fig. 1, left).

A $^{99\text{m}}\text{Tc}$ -polyphosphate scan the same day showed marked uptake in the spine, ribs, pelvis, humerus, femurs, and the site of biopsy—the sternum (Fig. 2).

The patient was given 100 mCi ^{131}I on March 23, 1973. A scan 3 days later (Fig. 1, right) again failed to show uptake in the metastatic bone lesions.

Each time the patient received radioactive iodine she had a drop in hematocrit requiring numerous transfusions of blood and packed RBC. At no time did this activity localize in the metastatic foci.

In view of the patient's progressive downhill course, the drop in RBC with radioactive iodine therapy, and lack of uptake by metastatic foci, alternative therapy was considered. Because of the multiple bone lesions, external radiation therapy was not considered practical. The excellent uptake of polyphosphate prompted the consideration of using ra-

Received Feb. 27, 1974; revision accepted May 16, 1974.

For reprints contact: Lazard Klinger, Lafayette General Hospital, 917 General Mouton, Lafayette, La. 70501.

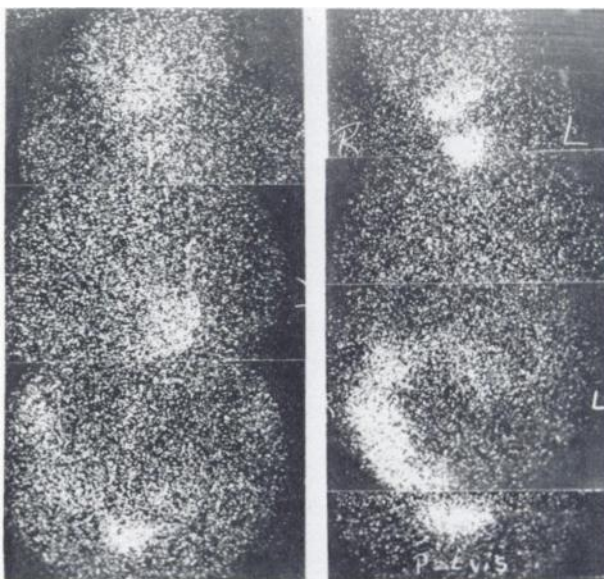


FIG. 1. Left, composite scan with 5 mCi ^{131}I on 3/22/73 after 10 units TSH a day for 3 consecutive days. Right, composite scan 3 days after 100 mCi ^{131}I (3/26/73).



FIG. 2. Composite scan with 15 mCi ^{99m}Tc -polyphosphate on 3/22/73.

radioactive phosphorus to at least achieve some palliation when the patient's blood picture stabilized.

Following Maxfield's technique (2,3) 2 mCi radiophosphorus were given intravenously for 3 days, preceded and followed by 100 mg testosterone daily for 5 consecutive days. Although there was some general improvement with relief in bone pain, the patient followed a downhill course, dying of what was considered liver failure by her referring physician on July 23, 1973.

DISCUSSION

The present protocol for management of adenocarcinoma of the thyroid utilizes ^{131}I to locate areas of concentration of iodine consistent with functioning metastatic disease. If none are found and no other findings are present, the patient is assumed to be free of disease. Since ^{99m}Tc -polyphosphate bone scans are now readily available and can localize metastatic bone foci that do not concentrate radioiodine, this procedure should be added to the protocol and performed on initial evaluation of patients with adenocarcinoma of the thyroid.

In a review of the literature, no reference to the treatment of bone metastases from adenocarcinoma of the thyroid with radiophosphorus was found. In this case, it was a logical choice since the patient's condition did not permit time for ablation of the thyroid activity and development of uptake of iodine by the metastatic foci. This approach offers an additional modality of therapy in a patient who is going progressively downhill with bone pain and in whom the usual course of therapy is ineffective.

REFERENCES

1. KRISHNAMURTHY GT, BLAHD WH: Diagnostic and therapeutic implications of long-term radioisotope scanning in the management of thyroid cancer. *J Nucl Med* 13: 924-927, 1972
2. MAXFIELD JR, MAXFIELD JGS: Clinical uses of radioactive isotopes. *Tex Med* 48: 449-453, 1952
3. MAXFIELD JR, MAXFIELD JGS, MAXFIELD WS: The use of radioactive phosphorus and testosterone in metastatic bone lesions from breast and prostate. *South Med J* 51: 320-328, 1958