

Marked gastric uptake of Tc-99m methylene diphosphonate (MDP) in a patient with myeloma and hypercalcemia

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A 59-year-old man presented with a 7-month history of increasing left shoulder pain. The initial plain films showed near absence of the left scapula and scattered lucent changes in the left humerus. A CT scan confirmed the presence of widespread lytic bony lesions, with a large soft-tissue mass centered around the left scapula. An isotope bone scan demonstrated marked uptake of MDP in the stomach and nasal mucosa. Further laboratory investigations revealed marked hypercalcemia and the presence of Bence-Jones protein in the urine. An ultrasound-guided biopsy of the soft-tissue mass confirmed the diagnosis of multiple myeloma.

Case report

A 59-year-old man presented with a 7-month history of left shoulder pain. The pain became increasingly severe, and he was admitted as an emergency under the care of the orthopedic surgeons for assessment and treatment. He was a nonsmoker and had no significant previous medical history.

A chest x-ray performed on admission, along with plain films of his left humerus (Fig. 1), showed near absence of much of the left scapula. There were scattered lucent changes in other bones, in particular the left humerus.

Laboratory investigations revealed mild anemia, with hemoglobin of 11.1 g/dl. There was also a moderate renal impairment, and serum creatinine on admission was 279 μ mol per liter.

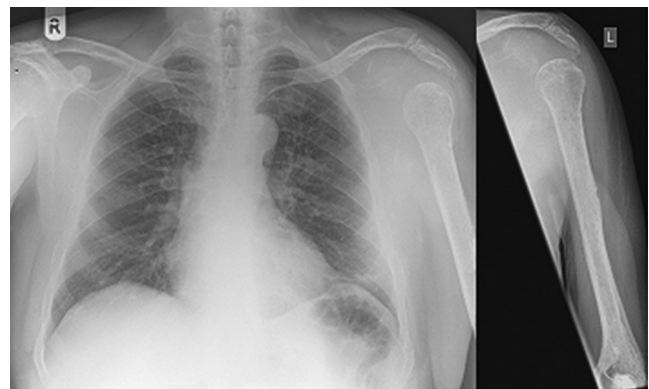


Figure 1. 59-year-old male with myeloma. Plain films of the chest and left humerus. The left scapula is almost entirely destroyed. Only a small amount of the acromion remains. The film of the left humerus demonstrates permeative bone loss throughout. A well-defined, punched-out lytic lesion is seen in relation to the midshaft of the left humerus.

A CT scan of the thorax, abdomen, and pelvis confirmed the presence of widespread lytic bony lesions, with a large soft-tissue mass centered around the left scapula (Fig. 2). An isotope bone scan demonstrated absence uptake in the left scapula, but note was made of a striking increased uptake by the stomach. There was also apparent increased uptake of tracer in the nasal mucosa, as well as low-grade uptake in the lung parenchyma (Fig. 3).

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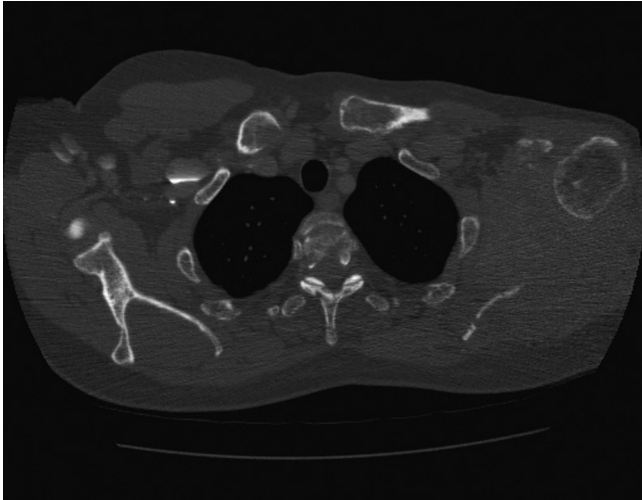


Figure 2. 59-year-old male with myeloma. Contrast-enhanced CT scan of the thorax. The left scapula was almost entirely missing. It was replaced by a large, homogeneous soft-tissue mass that was biopsied, confirming the diagnosis of myeloma.

Hypercalcemia was suspected because of the marked gastric uptake, and the clinical team was advised to check the serum calcium level; it was found to be 4.26 mmol per liter (normal range, 2.15 to 2.60). Appropriate emergency treatment for the marked hypercalcemia was instituted.

Subsequent urine analysis demonstrated positive Bence Jones protein, and an ultrasound-guided biopsy of the soft-tissue mass arising from the left scapula confirmed the diagnosis of myeloma.

Discussion

Gastric and soft-tissue uptake of MDP has been described in a number of malignant and nonmalignant diseases in the context of hypercalcemia, including bronchial carcinoma (1), vitamin D intoxication (2), sarcoidosis (3), and (as in this case) myeloma (4, 5). In one case, gastric uptake was shown to improve following reversal of hypercalcemia in a patient with primary hyperparathyroidism (6). Kanoh et al performed gastric biopsies in a patient with myeloma that demonstrated amyloid deposits, and it was hypothesized that this was the cause of the observed activity (5). Pulmonary uptake of MDP has also been described in hypercalcemia (7), and we take this to be the cause in this case.

Isotope bone scanning with MDP is not routinely recommended for the detection of skeletal involvement in myeloma, as the osteolytic lesions typically induce little or no osteoblastic response (8). However, some literature supports the use of Tc-99m Hexakis (2-methoxy-2-methylpropylisonitrile) (MIBI) in assessment, staging the prediction of prognosis in myeloma (9). More recently, skeletal involvement with myeloma has also been reported with 18F-fluorodeoxyglucose positron-emission tomogra-

phy, as well as positron-emission tomography with 11C choline (10).

In our case, there was also marked nasal uptake of MDP. After nasendoscopy, the patient's nasal mucosa was found to be entirely normal. Increased uptake of MDP in the paranasal sinuses may be posttraumatic or related to inflammatory or infective pathology (11, 12). In our patient, there was no history of trauma or any other clinical evidence of inflammatory change in the nasal cavity or naso-

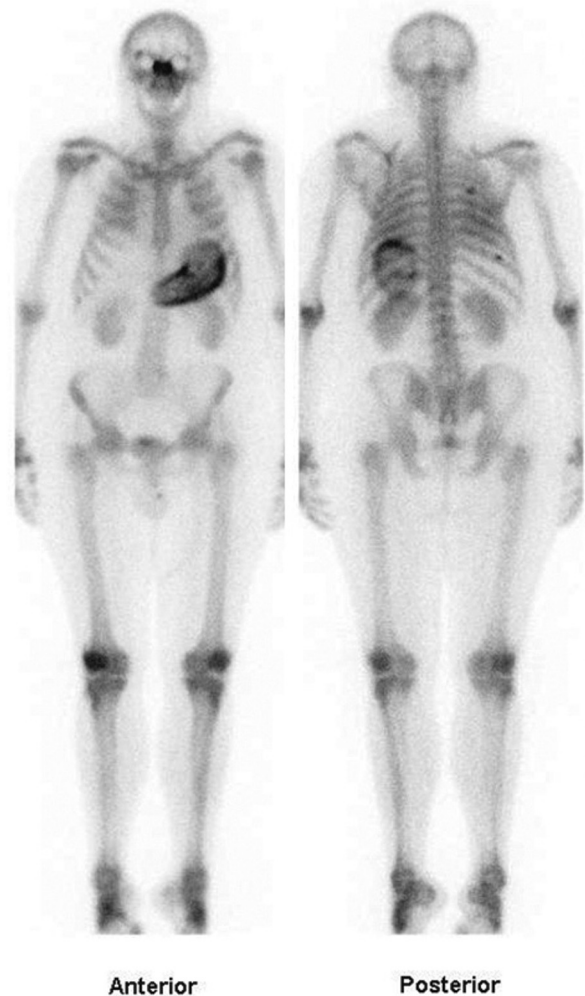


Figure 3. Isotope bone scan. Planar whole-body images obtained three hours following administration of 500 MBq of Tc-99m methylene diphosphonate (MDP). The striking finding was that of marked increased uptake by the stomach. Initially, the possibility of “free pertechnetate” was raised; however, none of the other patients scanned on the same day had any similar findings, and there was no salivary or thyroid uptake. This was therefore genuine gastric uptake of MDP. There was also increased activity arising from the nasal mucosa, as well as low-grade uptake in the lung parenchyma. (Uptake in the right 5th and 9th ribs posteriorly was related to minimally displaced fractures).

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pharynx. It is therefore possible that the nasal uptake was also related to the patient's marked hypercalcemia.

Prominent gastric uptake of MDP should therefore alert the reporting radiologist or physician to the possibility of hypercalcemia.

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