Unexpected Stomach Uptake of Technetium-99m-MDP

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Two pediatric cases are described in which the results of each patient's bone scan demonstrated abnormal stomach uptake. There have been a number of reports in the literature describing stomach uptake of bone agents, however, it is an uncommon finding.

Key Words: technitium-99m-MDP; stomach uptake

J Nucl Med Technol 1999; 27:43–44

Technetium-99m-MDP bone scintigraphy is a frequently used exam in nuclear medicine. Unexpected stomach uptake of ^{99m}Tc-MDP has been documented in the literature, however, it is uncommon.

CASE 1

A bone scan for metastatic disease was performed on a 3-y-old girl with medulloblastoma. The primary tumor had been resected 1 wk before the scan. Medications at the time of the scan included morphine (0.5 mg–1 mg intravenously every 6 h as needed), dexamethasone (2 mg intravenously every 6 h), ondansetron (1.7 mg intravenously or by mouth every 6 h) and famotidine (4.5 mg intravenously twice daily for 4 d followed by 5 mg intravenously twice daily). The famotidine had been given for a total of 11 d before imaging. At the time of imaging, a radiochromatograph of the ^{99m}Tc-MDP indicated a radiolabel of greater that 99%. The bone scan (Fig. 1) demonstrated unexpected stomach uptake of the ^{99m}Tc-MDP.

CASE 2

A 7-y-old girl with medulloblastoma and prior resection had a bone scan to evaluate metastatic disease. At the time of the scan, medications included ondansetron (as needed), dexamethasone (1 mg intravenously every 6 h), codeine solution (10–20 mg by mouth every 4 h as needed) and ranitidine (10 mg intravenously every 8 h for 3 d, then 40 mg by mouth every 12 h). Ranitidine was given for a total of 8 d before the bone scan. At the time of imaging, the radiochemical purity of the ^{99m}Tc-MDP was found to be greater than 98%. Unexpected localization of radioactivity in the stomach was visible on the bone scan (Fig. 2), but no thyroid or salivary glands were visualized.

DISCUSSION

Altered distribution of ^{99m}Tc radiopharmaceuticals often is due to increased amounts of pertechnetate, particularly if the stomach, thyroid, salivary glands and coroid plexes are visible on the image. The presence of pertechnetate in phosphate imaging kits has been reported in the early literature (*1*,*2*), and the potential for this problem still exists today. Although other conditions, such as microcalcification (*3*–*6*) and hyperclacemia (*7*,*8*), may cause stomach uptake on bone images, the most

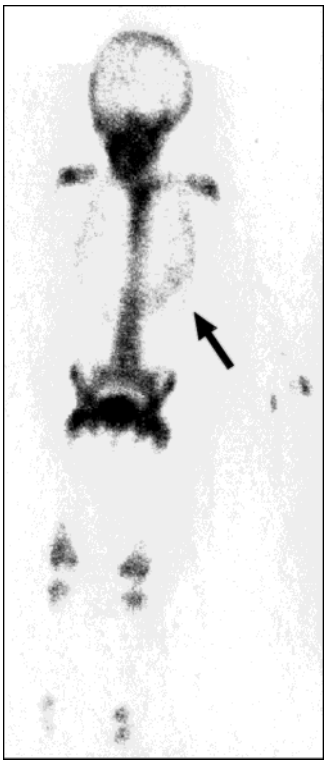

FIGURE 1. Anterior bone scan view showing stomach uptake (arrow).

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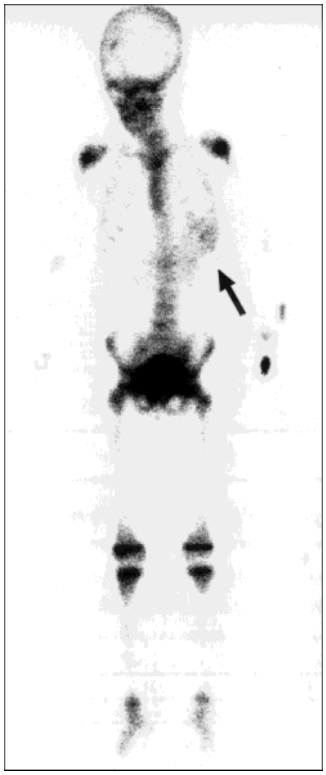

FIGURE 2. Anterior bone scan view showing stomach uptake (arrow).

common cause is formulation problems with the radiopharmaceutical kit (*3*).

Stomach uptake of a bone agent is seen most commonly in cancer patients in conjunction with either free pertechnetate or a paraneoplastic syndrome that is often, but not uniformly, associated with hypercalcemia. The exact mechanism for the observed phenomenon is not known. However, we do know that it is very unlikely that pertechnetate or hypercalcemia is involved because the kits yielded greater than 98% purity and the patients had no laboratory signs of hypercalcemia. Histamine H_2-receptor antagonists (e.g., famotidine and ranitidine) were the only drugs that both patients had in common. Although many patients who receive bone scans are on H_2-receptor antagonists, very few are receiving the drug intravenously. Therefore, it is possible that the uncommon bone scan is due to drug interference.

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