

Axillary lymph node uptake of Tc-99m MIBI resulting from extravasation should not be misinterpreted as metastasis

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Ipsilateral axillary lymph node visualization due to extravasation of Tc-99m MDP intravenous injection has been well documented. A patient with suspected angina underwent Tc-99m MIBI myocardial SPECT who had extravasation of Tc-99m MIBI in the antecubital region resulting in ipsilateral axillary lymph node uptake. This finding should not be misinterpreted as lymphatic nodal metastasis in a patient with breast cancer or lung cancer.

Key words: Tc-99m MIBI, axillary lymph node, lymphatic channel, lymphatic nodal metastasis

INTRODUCTION

IPSILATERAL AXILLARY or elbow visualization of the lymph node after infiltration of Tc-99m MDP or Tc-99m HMDP into the antecubital or wrist region has been reported.^{1,2} The molecular weight of the bone imaging agent Tc-99m HMDP is 512.99 which is also close to the molecular weight of Tc-99m MIBI, 777.96. Accordingly axillary lymph node in extravasation of Tc-99m MIBI may be observed. We present such a case of axillary lymph node visualization in a patient with antecubitally subcutaneous infiltration of Tc-99m MIBI.

A CASE REPORT

A 59-year-old man was referred for Tc-99m MIBI myocardial SPECT because of suspected angina. After iv injection of 1.221 GBq (33 mCi) Tc-99m MIBI imaging; anterior neck and thoracic images at thirty minutes showed a large area of increased uptake in the antecubital area resulting from infiltration, radiated lymphatic channels surrounding the hot area in the antecubital region and lymphatic channel toward to the axillary region, a focal area of increased uptake in the left axilla, and normal

uptake in the salivary gland, thyroid gland, lungs, heart, and the liver (Fig. 1). The two hours post-injection image showed persistent visualization of lymphatic channels toward the axillary region from the extravasation site, visualization of the axillary lymph node, and cardiac activity (Fig. 2). The results of myocardial SPECT concluded fixed hypoperfusion in the inferior wall of the left ventricle. After the Tc-99m MIBI myocardial SPECT this patient was followed-up for 6 months, he had not been found any malignancy including in the lung.

DISCUSSION

Incidental axillary lymph node visualization after radiotracer subcutaneous infiltration of bone imaging agent into the antecubital region has been well documented.^{1,3-5} Ipsilateral visualization of the lymph node in the elbow after infiltration Tc-99m HMDP into the wrist region has been reported.² Although this is infrequently seen in bone imaging agent uptake in the axillary lymph node, approximately 2% of axillary lymph node uptake has been visualized on bone scintigraphy,¹ Tc-99m MIBI uptake in axillary lymph node in extravasation of the radiopharmaceutical has not been reported.

Tc-99m MIBI, a lipophilic cationic complex, is widely used as a myocardial perfusion agent; like TI-201 chloride, which is used as a tumor imaging agent, Tc-99m MIBI, also has shown ability in the detection of various tumors.⁶⁻⁸ Lymph node uptake in a patient with

Received November 30, 1998, revision accepted April 1, 1999.

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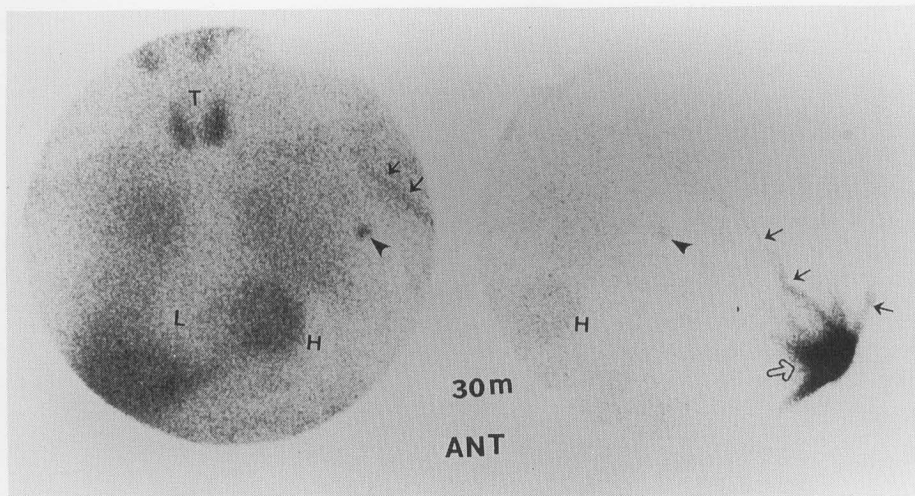


Fig. 1 Left, anterior neck and thoracic image shows a focal area of increased uptake in the left axilla as indicated by an arrowhead, lymphatic channels as indicated by double arrows, and normal uptake in the salivary gland, thyroid gland (T), lungs, heart (H), and the liver (L). Right, anterior left half thorax and left arm image shows a large area (as indicated by open arrow) of increased uptake in the antecubital area resulting from infiltration, surrounded by radiated lymphatic channel (arrows), axillary lymph node uptake (arrowhead), and normal cardiac activity (H).

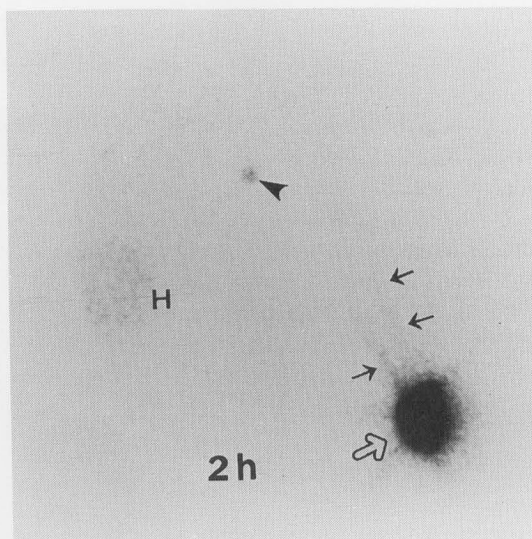


Fig. 2 Anterior left half thoracic and left arm image obtained two hours after injection shows increasing accumulation of axillary lymph node (arrowhead), and extravasation site (open arrow) compared with Figure 1 right image: Visualization of cardiac (H) activity and lymphatic channel (arrows) are almost same activity as Figure 1 right image.

osteosarcoma,⁷ lung cancer,^{9,10} melanoma,¹¹ thyroid cancer,¹² and breast cancer^{8,13-16} has been reported. Among these, uptake by lymph node(s) in breast cancer patients is almost always in the axillary region.^{8,13-16} In lung cancer patients, in addition to mediastinal lymph node uptake,^{9,10} the axillary lymph node localization of Tc-99m MIBI is possible. Thus axillary uptake in the ex-

travasation of Tc-99m MIBI should be carefully distinguished from lymphatic metastasis in the patients who have primary breast cancer or lung cancer. Keys for scintigraphic differentiation of lymphatic uptake due to extravasation from lymphatic metastasis include the apparent extravasation site in the antecubital area ipsilaterally and identification of lymphatic channels toward axilla as shown in Figure 1 and Figure 2.

Another condition that might lead to misinterpretation of axillary lymph node uptake originated from malignancy and/or extravasation of the radiopharmaceutical is an accumulation of Tc-99m MIBI in the sweat glands. Although the mechanism of this localization is unknown, 46% of hyperparathyroidism patients' sweat glands were observed.¹⁷ In this condition the axillary uptake is diffuse rather than focal, and usually symmetrical.

In summary, such visualization of the lymphatic channels as well as lymph node in our patient, whether Tc-99m MIBI can be utilize as lymphoscintigraphic agent should be further evaluation. Nevertheless, three probabilities explaining for an abnormal Tc-99m MIBI axillary uptake include lymphatic metastasis in breast cancer patients and possibly lung cancer patients, axillary sweat gland uptake, and axillary uptake due to extravasation of the radiopharmaceutical. Extravasation of Tc-99m MIBI always resulted in ipsilateral axillary uptake. The sweat gland accumulation of the agent usually is characterized by a diffuse uptake and symmetry on both axillae. For lymphatic metastatic disease, the areas of lymphatic uptake may be multiple and/or bilateral; however, there are often solitary lymph node metastasis.

REFERENCES

1. Ongseng F, Goldgarb CR, Finestone H. Axillary lymph node uptake of Tc-99m MDP. *J Nucl Med* 36: 1797-1799, 1995.
2. Shih WJ, Wierzbinske B, Magoun S. Lymph node visualization in the elbow region. *J Nucl Med* 37: 1913, 1996.
3. Chaterton BE, Vannitamby M, Cook DL. Lymph node visualization: an unusual artifact in the Tc-99m pyrophosphate bone scan. *Eur J Nucl Med* 5: 187-188, 1980.
4. Penny HR, Style CB. Fortuitous lymph node visualization after interstitial injection of Tc-99m MDP. *Clin Nucl Med* 7: 84-85, 1982.
5. Wallis JW, Fisher S, Whal RL. Tc-99m MDP uptake by lymph nodes following tracer infiltration: clinical and laboratory evaluation. *Nucl Med Commun* 8: 357-363, 1987.
6. Aktolun C, Bayhan H, Pabuccu Y, Bilgie H, Acar H, Koylu R. Assessment of tumor necrosis and detection of mediastinal lymph node metastasis in bronchial carcinoma with Tc-99m methoxyisobutylisonitrile (MIBI) imaging comparison with CT scan. *Eur J Nucl Med* 21: 973-979, 1994.
7. Caner B, Kiptapci M, Aras T, Erben G, Ugur O, Bekdik C. Increased accumulation of hexakis Tc-99m (I) in osteosarcoma and its metastatic lymph node. *J Nucl Med* 32: 1977-1978, 1991.
8. Lu G, Shih WJ, Huang HY, Long MQ, Sun Q, Liu YH, et al. Tc-99m MIBI mammoscintigraphy of breast masses: Early and delayed imaging. *Clin Med Communication* 16: 150-156, 1995.
9. Ceriani L, Giovanella L, Bandera M, Beghe B, Ortelli M, Roncari G. Semi-quantitative assessment of Tc-99m sestamibi uptake in lung cancer: relationship with clinical response to chemotherapy. *Nucl Med Commun* 18: 1087-1097, 1997.
10. Shih WJ, Turturro F, Stipp V, Desimone P. Ring appearance of Tc-99m MIBI thoracic SPECTs and increased uptake on Tc-99m HMDP thoracic SPECTs in a pulmonary mass of small cell carcinoma. *Ann Nucl Med* 10: 425-428, 1996.
11. Soler C, Perrot JL, Thiffet O, Beauchesene P, Lanthier K, Boucheron S, et al. The role of Tc-99m sestamibi SPECT in the follow-up of malignant melanoma and the detection of lymph node metastases. *Eur J Nucl Med* 24: 1522-1525, 1997.
12. Miyamoto S, Kasagi K, Misaki T, Alam MS, Konishi J. Evaluation of Tc-99m MIBI scintigraphy in metastatic differentiated thyroid carcinoma. *J Nucl Med* 38: 352-356, 1997.
13. Taillefer R, Robidoux A, Turpin S, Lamber R, Cantin J, Leveille J. Metastatic axillary lymph node Tc-99m MIBI imaging in primary breast cancer. *J Nucl Med* 39: 459-464, 1998.
14. Pamedo H, Schomburg A, Grunwald F, Mallmann P, Boldt I, Biersack HJ. Scintimammography with Tc-99m MIBI in patients with suspicious of primary breast cancer. *Nucl Med Biol* 23: 681-684, 1996.
15. Acky MN, Akin Y, Karabag B, Ozcan O, Oren D. Tc-99m tetrofosmin in breast carcinoma and axillary lymph node metastases: a comparative study with Tc-99m MIBI. *Clin Nucl Med* 22: 832-834, 1997.
16. Schillaci O, Scopinaro F, Danieli R, Tavolaro R, Picardi V, Cannas P, et al. Tc-99m sestamibi in patients with suspicious breast lesions: comparison of SPECT and planar images in the detection of primary tumors and axillary lymph node involvement. *Nucl Med Commun* 18: 839-845, 1997.
17. Jonsson C, Farnebo LO, Fernstrom A, Jacobsson H. Sweat Glands accumulate Tc-99m MIBI. *Clin Nucl Med* 21: 612-614, 1996.