

## SPECT images using $^{99m}\text{Tc(V)}$ -DMS in lung metastasis of osteosarcoma

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Color images of single-photon emission computed tomography (SPECT) using technetium- $^{99m}\text{Tc(V)}$  dimercaptosuccinic acid ( $^{99m}\text{Tc(V)}$ -DMS) were demonstrated in a patient with lung metastases from osteosarcoma. SPECT image using  $^{99m}\text{Tc(V)}$ -DMS could be useful for the detection of lung metastasis from osteosarcoma.

**Key words:** osteosarcoma, SPECT,  $^{99m}\text{Tc(V)}$ -DMS, lung metastasis

### INTRODUCTION

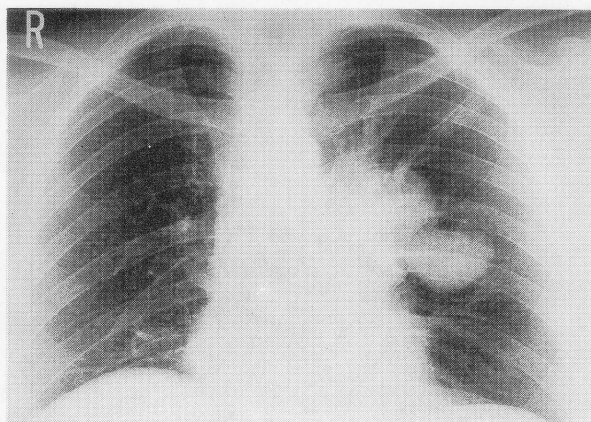
WE HAVE REPORTED before the potential of single-photon emission computed tomography (SPECT) using technetium- $^{99m}\text{Tc(V)}$  dimercaptosuccinic acid ( $^{99m}\text{Tc(V)}$ -DMS) in the early diagnosis of lung metastasis from osteosarcoma.<sup>1</sup> But the previous images were not so clear. In this paper, we demonstrated the color images of SPECT using  $^{99m}\text{Tc(V)}$ -DMS which were useful in evaluating lung metastases from osteosarcoma.

### METHODS

$^{99m}\text{Tc(V)}$ -DMS was prepared as already reported.<sup>1</sup> Scintigrams were made 90 minutes after i.v. administration of 20 mCi  $^{99m}\text{Tc(V)}$ -DMS. SPECT (Maxi 400T, GE) was performed with 64 different views over 360 degrees and 15 seconds each for every 5.6 degrees of rotation. No attenuation correction was made.

### CASE REPORT

A 30-year-old man, who had suffered from left hip joint disarticulation due to osteosarcoma, complained of dyspnea and cough. A chest X-ray film showed well demarcated large tumors in the middle field of the left lung (Fig. 1). A  $^{99m}\text{Tc(V)}$ -DMS scintigram showed hot spots in the left thoracic region but it



**Fig. 1** Chest film showing abnormally large tumors in the middle field of the left lung.

was difficult to differentiate tumor uptake from the activity of the heart and great vessels (Fig. 2). SPECT images using  $^{99m}\text{Tc(V)}$ -DMS (Fig. 3 and Fig. 4) revealed there were definite accumulations in the tumors that TCT scan demonstrated (Fig. 5). Lung metastases from osteosarcoma were confirmed by transbronchial lung biopsy.

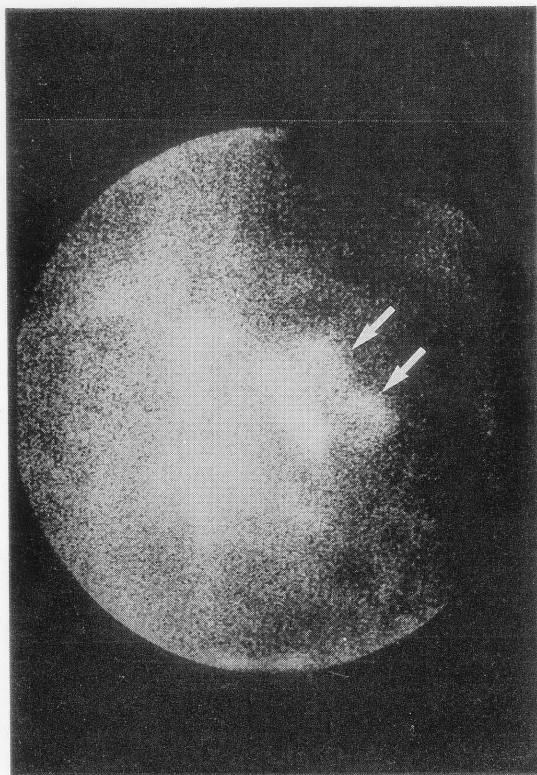
### DISCUSSION

Positive  $^{99m}\text{Tc(V)}$ -DMS SPECT images in a patient with lung metastases from osteosarcoma were demonstrated. The areas in which  $^{99m}\text{Tc(V)}$ -DMS accumulated coincided with tumors that TCT scan demonstrated.

It has been reported that because of the osteoid tissue in the tumor, some soft tissue and visceral metastases from osteosarcoma take up bone-seeking

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**Fig. 2**  $^{99m}\text{Tc(V)}$ -DMS planer image showing hot spots in the left thoracic region but not clear due to high background radioactivity (arrows).

agents, and this has been utilized to improve the early diagnosis of lung metastases. However, plain chest radiograph appears more sensitive than bone scan for detecting lung metastasis from osteosarcoma.<sup>2</sup>

Incidentally, advances in instrument development and the development of new radiopharmaceuticals have provided encouraging results in the detection of neoplasm. SPECT is an investigative technique because it improves localization in depth, particularly in areas of significant background such as near the heart and great vessels,<sup>3</sup> and newly developed  $^{99m}\text{Tc(V)}$ -DMS, which has high affinity for the osseous tissue,<sup>4</sup> is a promising tumor seeking agent.<sup>5</sup>

The usefulness of SPECT using  $^{99m}\text{Tc}$ -MDP in

evaluating osteosarcoma metastasis in the lung is also reported.<sup>6</sup> And we could also obtain clear images with SPECT using  $^{99m}\text{Tc(V)}$ -DMS, although the comparison of the two  $^{99m}\text{Tc}$ -compounds remains to be studied for the detection of lung metastasis from osteosarcoma.

It is not easy to predict the role that new radiopharmaceuticals will play in the future application of SPECT in oncology.<sup>3</sup> This case suggested that SPECT using  $^{99m}\text{Tc(V)}$ -DMS might be useful in detecting early lung metastasis from osteosarcoma even if it exists near the heart and great vessels, because nuclear images are based on biochemical changes which may proceed before morphologic changes.

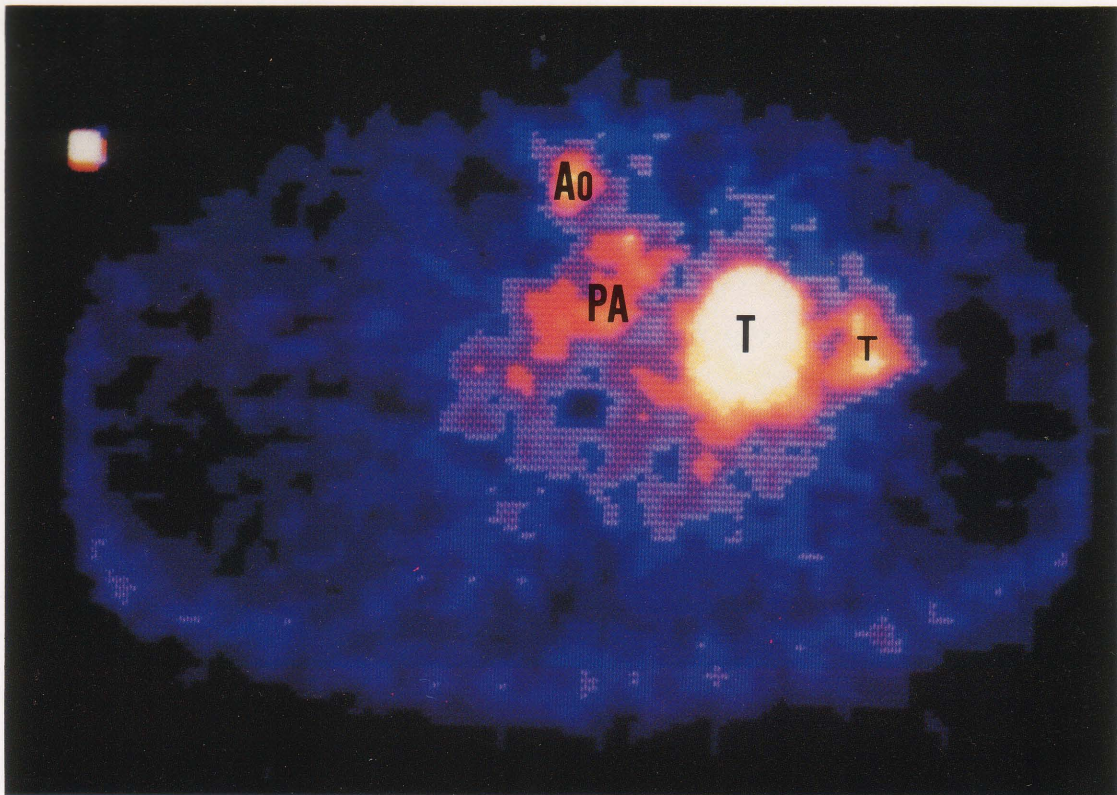
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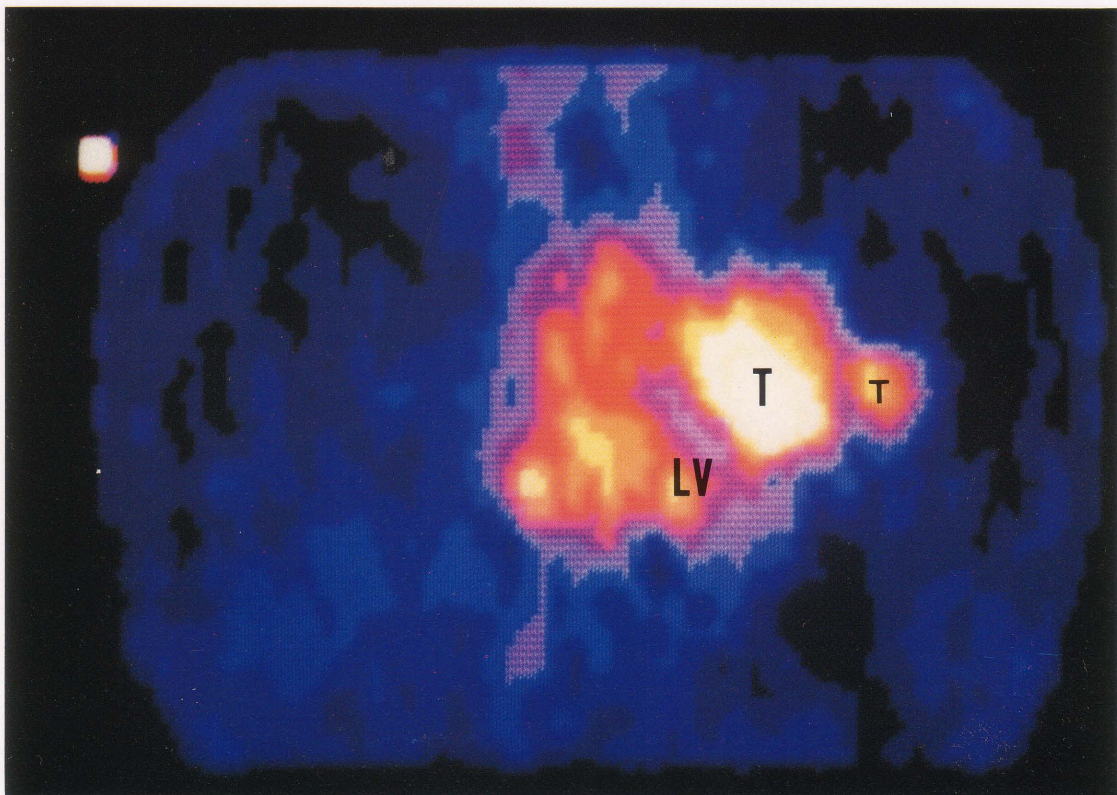
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**Fig. 3** Transverse section SPECT image of Fig. 2 (PA: pulmonary artery, Ao: ascending aorta, T: tumor).



**Fig. 4** Coronal section SPECT image of Fig. 2 (LV: left ventricle).



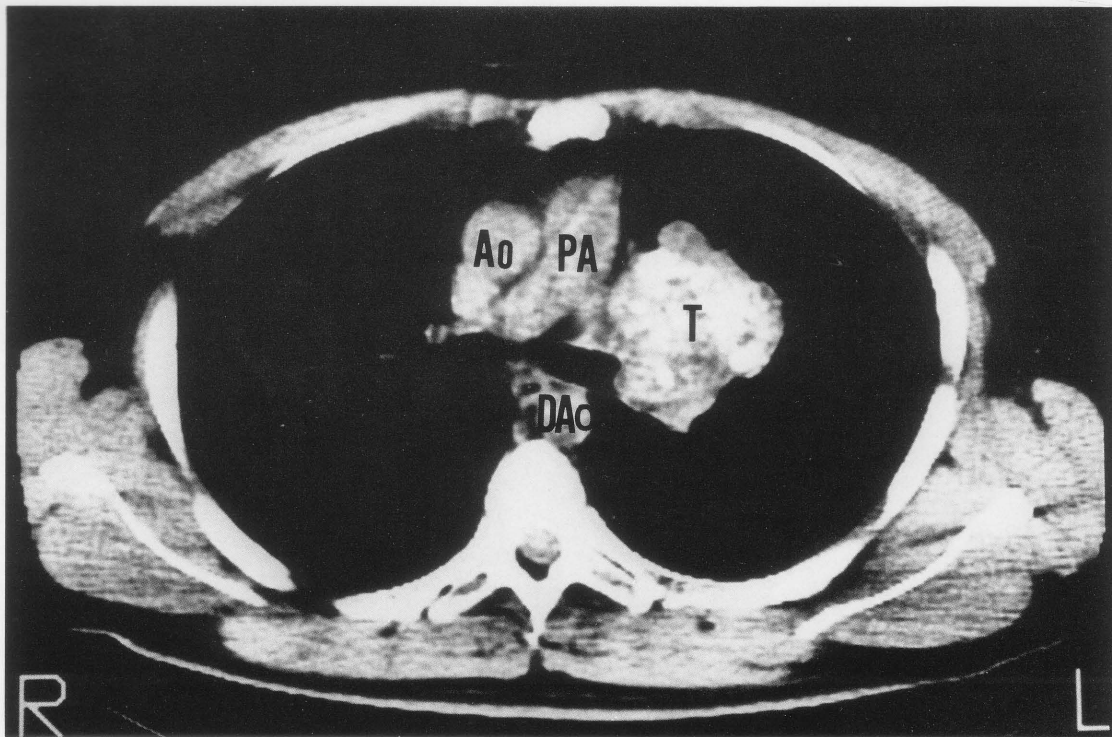


Fig. 5 TCT scan showing a large mass at the left hilum (DAo: descending aorta).