

## Brief Note

### $^{99m}\text{Tc}$ -DTPA Uptake in Bone Metastatic Lesions

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**Key words:**  $^{99m}\text{Tc}$ -DTPA — bone metastasis — bone scintigraphy

$^{99m}\text{Tc}$ -DTPA has been used for routine brain and kidney studies. Recently, it has been found to accumulate in various types of tumors; e.g. neurofibroma,<sup>1)</sup> leiomyosarcoma,<sup>2)</sup> liposarcoma<sup>3)</sup> and plasmacytoma.<sup>4)</sup> We report a case in which uptake of  $^{99m}\text{Tc}$ -DTPA was demonstrated in bone metastases from renal pelvic cancer.

A 68-year-old man was admitted to our hospital because of radiation therapy for bone metastases from renal pelvic cancer. Bone scintigraphy showed abnormal accumulation of radionuclide in the lumbar vertebrae and pelvis (Fig. 1a). A renal dynamic study using  $^{99m}\text{Tc}$ -DTPA was performed to evaluate renal function. In the lumbar vertebrae and sacroiliac joints, as well as in a  $^{99m}\text{Tc}$ -HMDP bone scan,  $^{99m}\text{Tc}$ -DTPA scintigraphy demonstrated a significant accumulation of radioactivity in the early phase, which disappeared gradually later (Fig. 1b).

Although the exact mechanism of uptake of  $^{99m}\text{Tc}$ -DTPA is not known, it

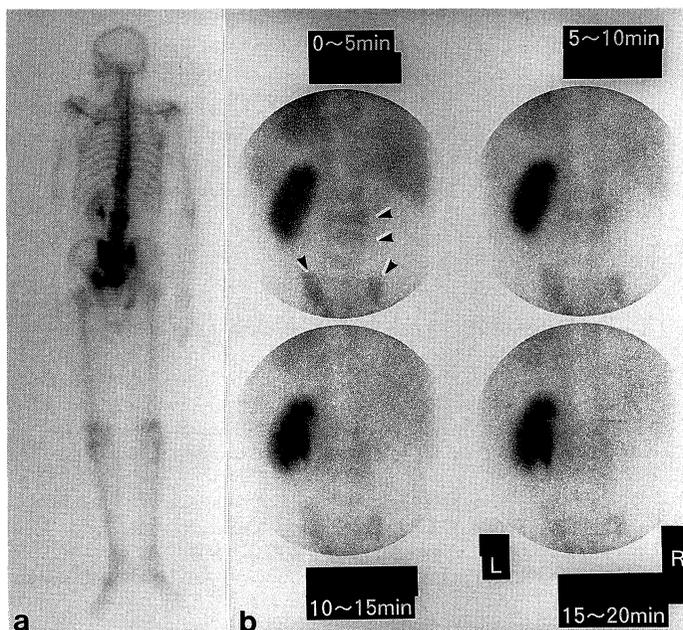


Fig. 1a. Bone scintigraphy shows multiple areas of increased activity in the lumbar vertebrae and pelvis.

Fig. 1b. A  $^{99m}\text{Tc}$ -DTPA renal flow study shows increased activity in the lumbar vertebrae and sacroiliac joints.

may be similar to the change in blood-brain barriers that occurs in tumors and inflammation. Acute inflammation and tumors are known to be associated with dilatation of the arterioles, increase in capillary blood flow and permeability, and capillary sprouting. These changes may bring more accumulation of DTPA to the site of inflammation and promote its permeation into the tumor cells.<sup>3)</sup>

In this case, the bone metastases and/or associated increased blood flow<sup>5)</sup> may have led to this phenomenon.

Bone scintigraphy with <sup>99m</sup>Tc-labeled phosphorous compound is an excellent technique for the detection and follow-up of malignant bone metastasis. However, more radioactivity has been observed in metastatic lesions in the early period of the therapy on bone scintigraphy rather than before treatment (the so-called flare phenomenon).<sup>6)</sup> In this case, there was no change in activity after radiation therapy bone scintigraphy despite of improvement of lumbar pain.

Therefore, the <sup>99m</sup>Tc-DTPA scan, which reflects blood flow in metastatic lesions, may be more useful than the <sup>99m</sup>Tc-HMDP bone scan in the early evaluation of the therapeutical effect of bone metastasis.

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