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Scintigraphic evaluation of two cases with alveolar soft part sarcoma

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Two cases of alveolar soft part sarcoma were examined with gallium-67 citrate (^{67}Ga), technetium-99m-methylenediphosphate (^{99m}Tc-MDP) and technetium-99m(V)-dimercaptosuccinic acid (Tc(V)-DMS) to compare the sensitivity of these three radiopharmaceuticals.

All scintigrams were positive with primary tumor, and images with Tc(V)-DMS were the best. Skull metastasis could be also detected by all agents, but scintigrams with lung metastases were negative. In scintigraphic evaluation of alveolar soft part sarcoma, Tc(V)-DMS may be a better agent than ^{67}Ga or ^{99m}Tc-MDP.

Key words: Alveolar soft part sarcoma, ^{99m}Tc-MDP, ^{67}Ga-citrate, ^{99m}Tc(V)-dimercaptosuccinic acid

INTRODUCTION

ALVEOLAR SOFT PART SARCOMA is an uncommon neoplasm. According to Enzinger and Weiss, the frequency is estimated as between 0.5% and 1.0% of all soft tissue sarcomas,[1] and only a few scintigraphic images of this type of tumor have been previously reported.[2] The usefulness of gallium-67 citrate (^{67}Ga), technetium-99m-methylenediphosphate (^{99m}Tc-MDP) and technethium-99m(V)-dimercaptosuccinic acid (Tc(V)-DMS) scintigraphies in soft tissue sarcomas has been reported.[3–6]

Recently we made a scintigraphic evaluation of 2 cases of alveolar soft part sarcoma. The images were demonstrated and the usefulness of Tc(V)-DMS was discussed.

MATERIALS AND METHODS

Commercially available ^{67}Ga and ^{99m}Tc-MDP were used in the present study.

Tc(V)-DMS was produced at the Daiichi Radioisotope Laboratories (Tokyo) as previously reported.[6,7] In brief, vials containing 1.36 mg of dimercaptosuccinic acid, 1.26 mg of $NaHCO_3$, 0.11 mg of $SnCl_2 \cdot 2H_2O$, and 30 mg of glucose were lyophilized and stored at 4°C. Labeling was performed by the addition into the kit of 0.1 mg of 7% $NaHCO_3$ with 2–3 m*l* of pertechnetate with the desired activity. Scintigrams were made 120 min, 120 min and 48 hrs after i.v. administration of 10 mCi ^{99m}Tc-MDP, 10 mCi Tc(V)-DMS and 2 mCi ^{67}Ga, respectively, using a conventional gamma camera. These scintigraphies were performed within a period of 2 weeks.

CASE REPORTS

Case 1

A 26-year-old man noticed an asymptomatic diffuse swelling of the left thigh without precipitating cause, but underwent no therapy. One year later, he also noticed a tumor of 1 cm in diameter on his right forehead. The tumor increased in size rapidly. The forehead tumor was clearly demonstrated by Tc(V)-DMS and ^{67}Ga, and intense uptake of ^{99m}Tc-MDP suggested bone reaction in the tumor margin (Fig. 1). Intense accumulation of Tc(V)-DMS in the left thigh was also recognized, but ^{67}Ga and ^{99m}Tc-MDP accumulation were less intense (Fig. 2). Alveolar soft

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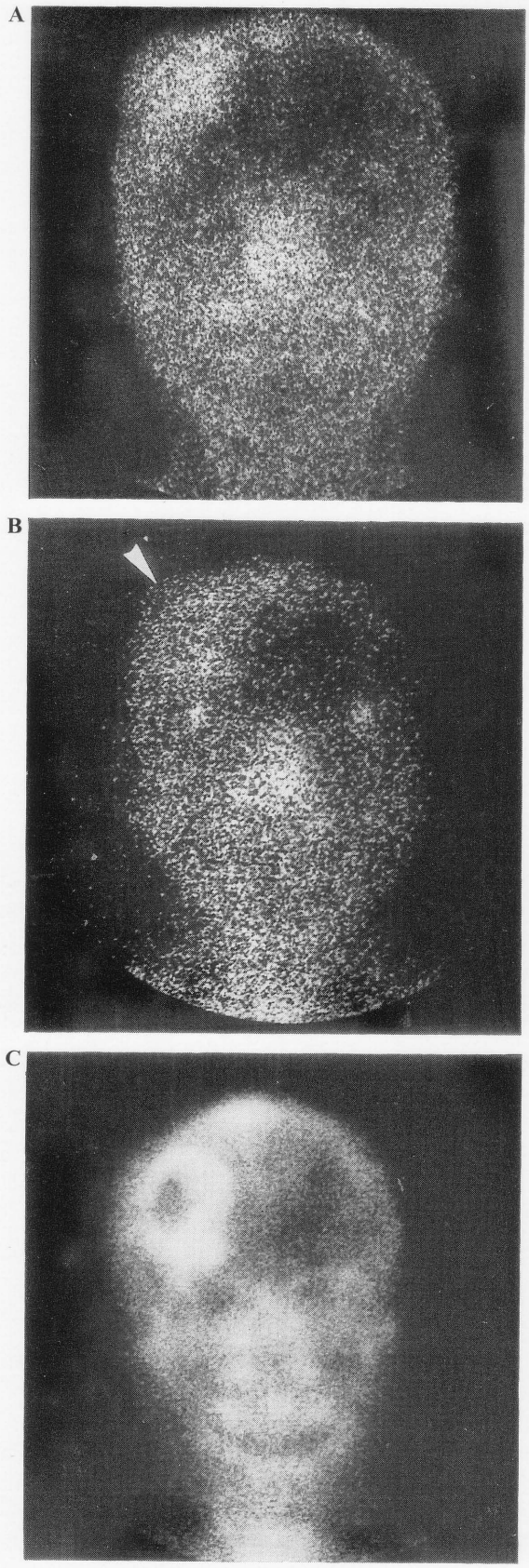


Fig. 1A, 1B and 1C
Tc(V)-DMS (A), ^{67}Ga (B) and ^{99m}Tc-MDP (C) scintigrams of a patient with skull metastasis of alveolar soft part sarcoma (Case 1).

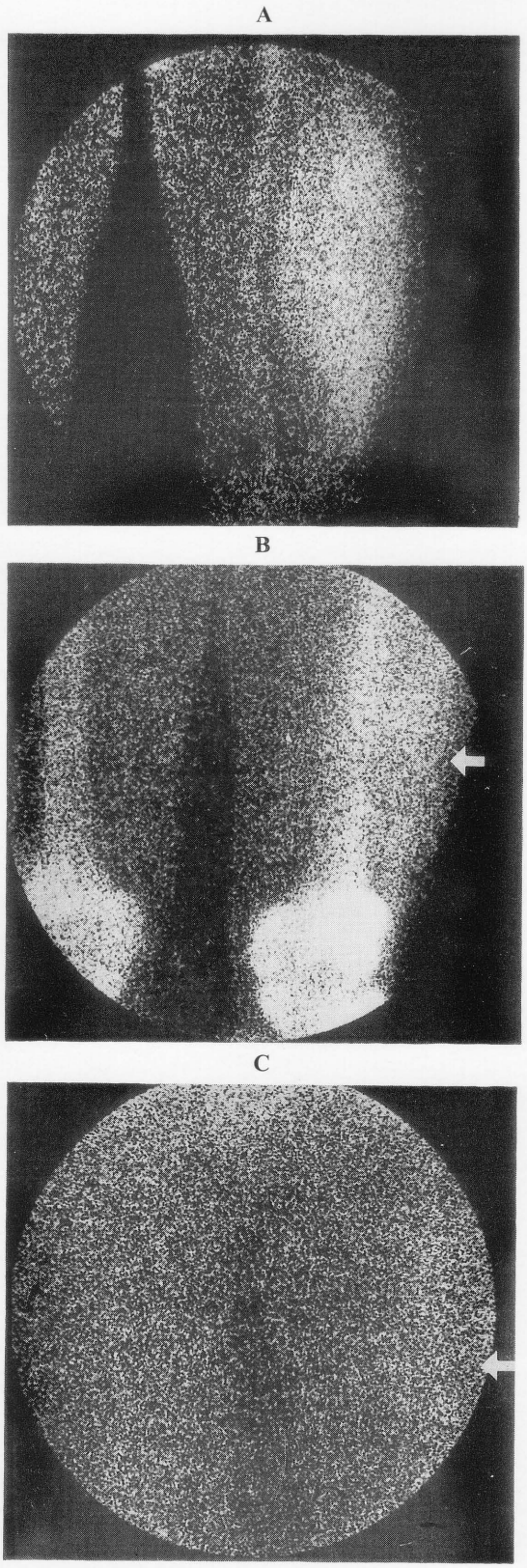


Fig. 2A, 2B and 2C
Tc(V)-DMS (A), ^{67}Ga (B) and ^{99m}Tc-MDP (C) scintigrams of a patient with alveolar soft part sarcoma of the left thigh (Case 1). The uptake of Tc(V)-DMS by the tumor was intense but those of ^{67}Ga and ^{99m}Tc-MDP were less intense.

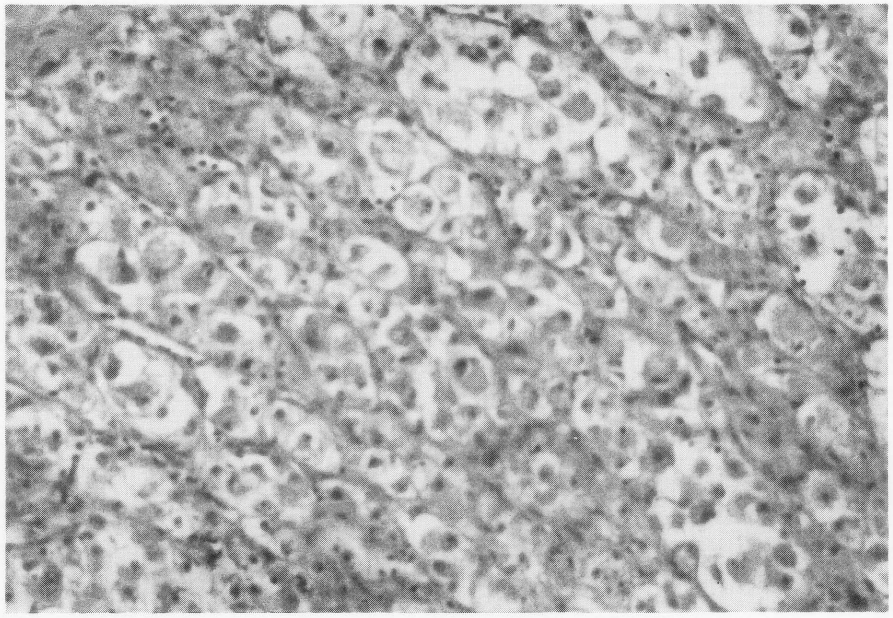


Fig. 3 Histopathology revealing alveolar soft part sarcoma (H-E stain, × 100) (Case 1).

part sarcoma and its skull metastasis were confirmed at surgery (Fig. 3).

Case 2

A 37-year-old man noticed a fist-sized tumor in his right thigh. He thought it was because of contusion and underwent no therapy. One month later, spasmodic coughing attacks occurred daily during the night or early in the morning. A chest film disclosed multiple coin-shaped lesions as shown in Fig. 4. Tc(V)-DMS. ^{99m}Tc-MDP and ^{67}Ga localized in the tumor of the right thigh (Fig. 5). However, lung metastases were not detectable with any of the radiopharmaceuticals (Fig. 6). Tumor biopsy revealed alveolar soft part sarcoma.

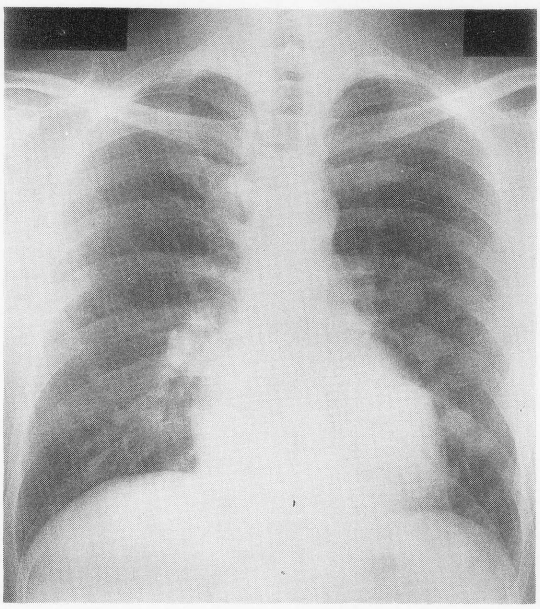


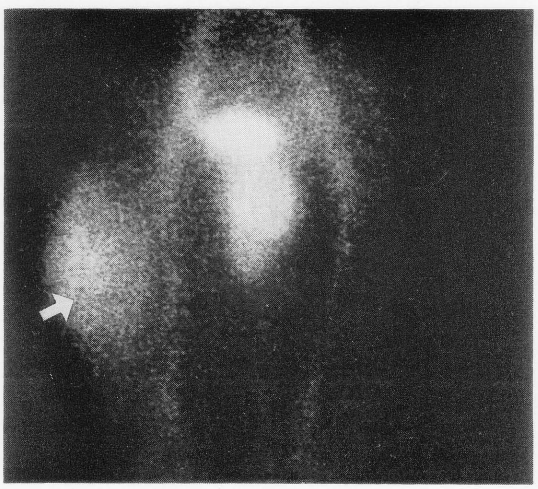
Fig. 4 Chest film suggesting multiple lung metastases (Case 2).

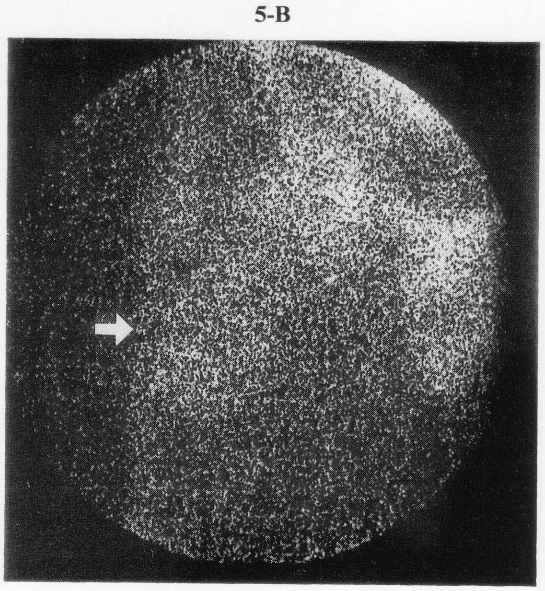
DISCUSSION

Enzinger and Weiss describe that the ultimate prognosis of alveolar soft part sarcoma is poor despite the relatively slow growth of the tumor. The principal metastatic sites are the lung followed by the brain and skeleton.[1]

In the therapy of soft tissue tumors, it is important to diagnose the extent and localization. This paper describes scintigraphic imagings of alveolar soft part sarcoma using ^{67}Ga, ^{99m}Tc-MDP and Tc(V)-DMS. Tc(V)-DMS images were better than ^{67}Ga or ^{99m}Tc-MDP images for detecting the primary tumor. Skull

5-A





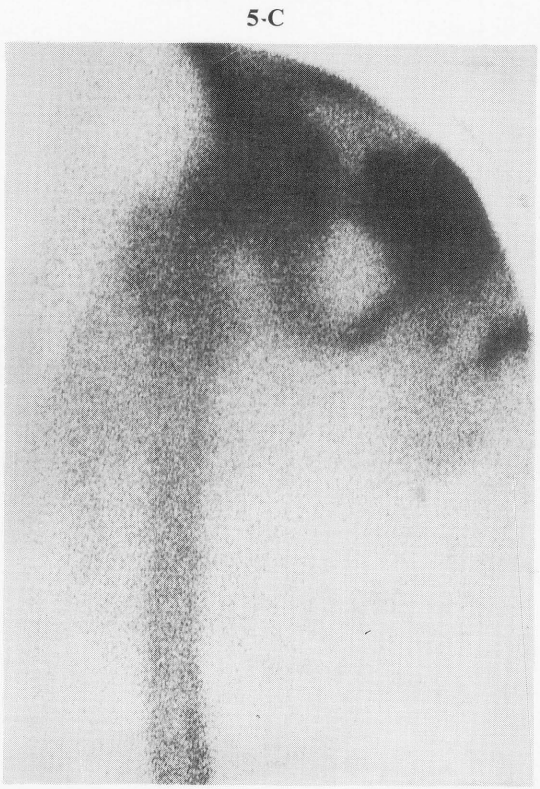
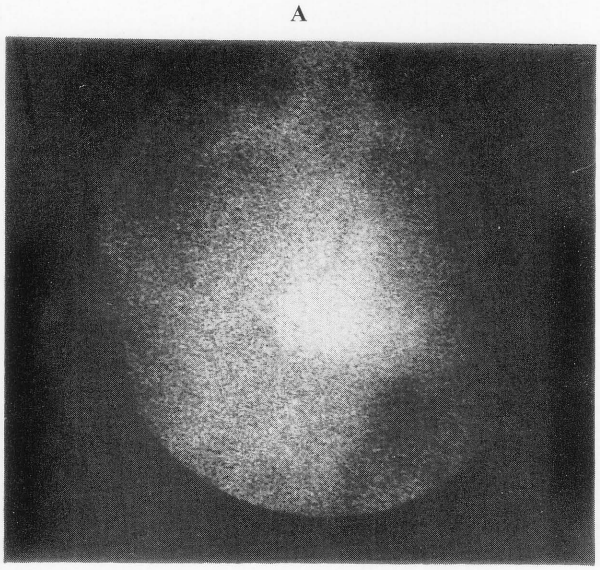


Fig. 5A, 5B and 5C
Tc(V)-DMS (A), ^{67}Ga (B) and ^{99m}Tc-MDP (C) scintigrams of a patient with alveolar soft part sarcoma of the right thigh (Case 2).



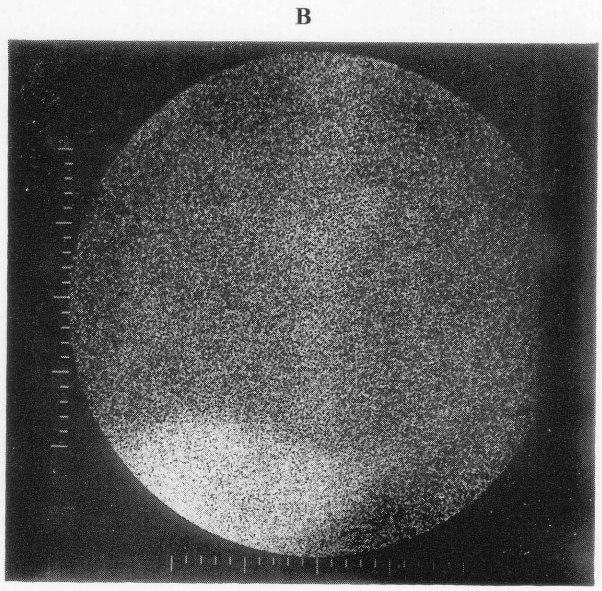


Fig. 6A, and 6B
Tc(V)-DMS (A), and ^{67}Ga (B) scintigrams of the lung. Lung metastases could not be detected scintigraphically; metastases not visible with ^{99m}Tc-MDP either (Image not shown).

metastasis was also detectable, but ^{99m}Tc-MDP showed bone reaction in the tumor margin. The metastatic tumor itself could be detected most clearly by Tc(V)-DMS. No agents could demonstrate a clear accumulation for lung metastases. There are many factors which influence the outcome of tumor imaging, such as tumor uptake ratio compared with the surrounding normal tissue, tumor area, tumor depth and photon attenuation. The failure to detect the lung metastases might be caused by these factors, even though the primary tumor and the lung metastases had the same absolute count rate per gram tissue.

These results suggested that scintigraphic study might not be a satisfactory method to assess alveolar soft part sarcoma. However, scintigraphy is easy and noninvasive and can be repeated frequently. Tc(V)-DMS was thought to be the first choice of radiopharmaceuticals for scintigraphic examination of alveolar soft part sarcoma.

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