Scintigraphic Evaluation of Aggressive Fibromatosis

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Despite its benign microscopic appearance, aggressive fibromatosis has potential to recur and infiltrate neighboring tissues. Therefore, it is necessary to determine the exact extent before therapy. In the present study, 11 cases of aggressive fibromatosis were examined scintigraphically using [^{99m}Tc(V)]dimercaptosuccinic acid (11 cases) and ^{67}Ga-citrate (7 cases). Technetium-99m-(V)-dimercaptosuccinic acid demonstrated all lesions, while ^{67}Ga-citrate detected 57% of the cases.

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Aggressive fibromatosis (extraabdominal desmoid) is a relatively rare tumor, which arises from the connective tissue of muscle, fascia, or aponeurosis and chiefly affects the shoulder, pelvic girdle, and thigh of young adults. Despite its benign microscopic appearance, aggressive fibromatosis is clinically malignant, since it has potential to recur and infiltrate neighboring tissues in the manner of a fibrosarcoma (*1*). Therefore, it is important to determine the exact location and extent of the tumor when planning surgical treatment.

Soft-tissue tumors can be imaged with gallium-67-citrate (^{67}Ga-citrate) (*2*) or technetium-99m(V)-dimercaptosuccinic acid ([^{99m}Tc(V)]DMSA) (*3,4*). We evaluated both [^{99m}Tc(V)]DMSA and ^{67}Ga to determine the location and extent of aggressive fibromatosis.

MATERIALS AND METHODS

Eleven patients with histologically proven disease were examined. Six out of 11 were recurrent cases. In seven cases, scintigraphic results of [^{99m}Tc(V)]DMSA were compared with those obtained using ^{67}Ga within two weeks. In six cases, follow-up [^{99m}Tc(V)]DMSA scintigraphy was performed after operation. Upon i.v. administration of 370–740 MBq [^{99m}Tc(V)]DMSA or 111 MBq ^{67}Ga, scintigraphy was performed after 2 hr and 72 hr, respectively, using a conventional gamma camera.

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RESULTS

Results are summarized in Table 1. Technetium-99m(V)-DMSA concentrated in all 11 tumors while ^{67}Ga was positive in 54% (4/7) of the cases. Surgery and pathologic examination revealed that [^{99m}Tc(V)] DMSA accumulation showed exact location and extent. Multiple sites of accumulation in Case 10 were all recurrent tumors. There was follow-up [^{99m}Tc(V)] DMSA examinations in six patients. Three cases were examined 3 mo after surgery and faint [^{99m}Tc(V)] DMSA accumulation was still seen along the surgical wound. The other three cases were examined after more than 6 mo and no apparent accumulation was recognized. (Cases of interest are shown in Figure 1.)

DISCUSSION

Since aggressive fibromatosis has potential to recur and to infiltrate neighboring tissues, therapy should be predicated on its exact location and extent (*1*). Previously, ^{99m}Tc-bleomycin was reported to have particular usefulness in assessing the extent of aggressive fibromatosis (*5*). However, ^{99m}Tc-bleomycin is not widely used.

TABLE 1
Results of [^{99m}Tc(V)]DMSA and ^{67}Ga Scintigraphy in 11 Patients with Aggressive Fibromatosis

Case	Sex	Site	[^{99m}Tc(V)] DMSA	^{67}Ga-citrate
1	F	trunk	+	+
2	F	leg	+	+
3	M	shoulder	+	+
4	F	trunk	+	−
5	F	trunk (recurrence)	+	−
6	F	trunk (recurrence)	+	−
7	M	trunk (recurrence)	+	+
8	M	leg	+	ND
9	F	leg (recurrence)	+	ND
10	F	arm (recurrence, multiple)	+	ND
11	M	shoulder (recurrence)	+	ND

+ = positive; − = negative; and ND = not done.

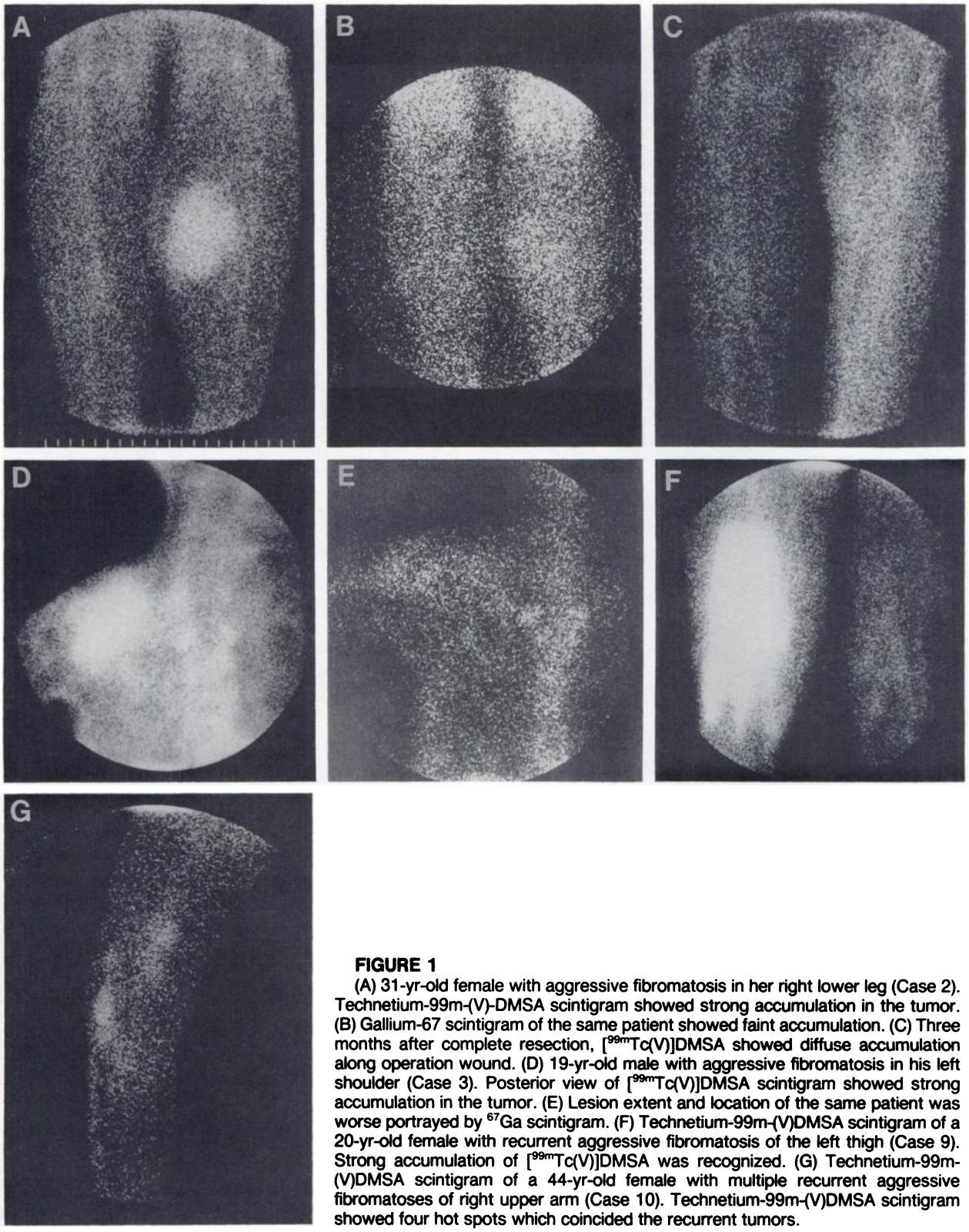

FIGURE 1

(A) 31-yr-old female with aggressive fibromatosis in her right lower leg (Case 2). Technetium-99m-(V)-DMSA scintigram showed strong accumulation in the tumor. (B) Gallium-67 scintigram of the same patient showed faint accumulation. (C) Three months after complete resection, [^{99m}Tc(V)]DMSA showed diffuse accumulation along operation wound. (D) 19-yr-old male with aggressive fibromatosis in his left shoulder (Case 3). Posterior view of [^{99m}Tc(V)]DMSA scintigram showed strong accumulation in the tumor. (E) Lesion extent and location of the same patient was worse portrayed by ^{67}Ga scintigram. (F) Technetium-99m-(V)DMSA scintigram of a 20-yr-old female with recurrent aggressive fibromatosis of the left thigh (Case 9). Strong accumulation of [^{99m}Tc(V)]DMSA was recognized. (G) Technetium-99m-(V)DMSA scintigram of a 44-yr-old female with multiple recurrent aggressive fibromatoses of right upper arm (Case 10). Technetium-99m-(V)DMSA scintigram showed four hot spots which coincided the recurrent tumors.

For radionuclide imaging of soft-tissue tumors. ^{67}Ga has been reported to be the best available isotope (*2*). Present studies clearly demonstrated that [^{99m}Tc(V)] DMSA offers advantages over ^{67}Ga for imaging of aggressive fibromatosis. Technetium-99m-DMSA has superior physical properties for imaging, and delineated the lesions within 2 hr of injection. Although the mechanism of tumor uptake of [^{99m}Tc(V)]DMSA is not clearly understood, [^{99m}Tc(V)]DMSA accumulation in soft tissue is not specific for aggressive fibromatosis.

Technetium-99m-DMSA accumulation is also seen in other soft-tissue tumors and even in surgical scars (*4*). Even though some residual uptake was seen at sites of surgical scar, it was not difficult to distinguish the accumulation in the recurrent tumor from that of the surgical wound.

Although the accumulation mechanism of [^{99m}Tc(V)] DMSA remains to be studied and nonspecific accumulation might reduce the effectiveness of [^{99m}Tc(V)] DMSA, [^{99m}Tc(V)]DMSA seemed to be superior to ^{67}Ga in evaluating the aggressive fibromatosis. The usefulness of other modalities such as computed tomography, angiography, and magnetic resonance imaging in evaluating aggressive fibromatosis has been reported (*6,7*). The role and correlation of [^{99m}Tc(V)]DMSA with other modalities is under investigation.

In conclusion, [^{99m}Tc(V)]DMSA scintigraphy was of good use in evaluating the location and extent of aggressive fibromatosis.

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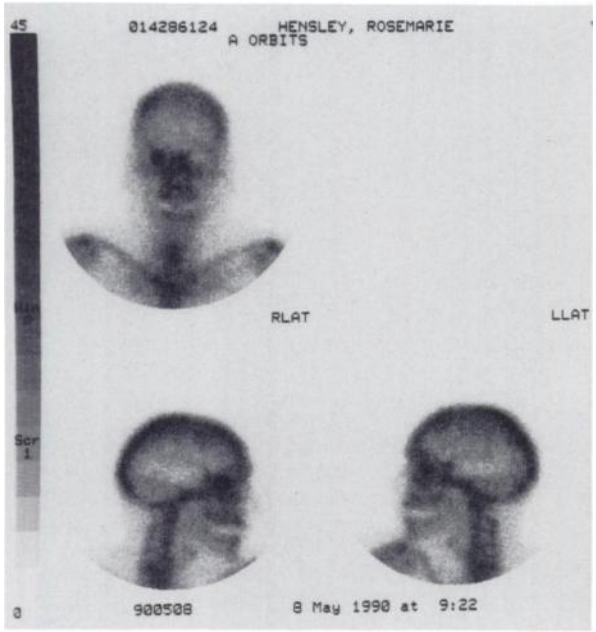
FIRST IMPRESSIONS



PURPOSE:
The Opthamology Department is involved in research on the implanting of orbital prostheses made of hydroxy apatite. The eye muscles are attached and radionuclides are injected in order to know if satisfactory vascularity has been achieved. In this case, uptake was intense in the prostheses and the project moved ahead. The study was done approximately 6 months after the implant was placed.

TRACER:
^{99m}Tc-MDP.

ROUTE OF ADMINISTRATION:
Intravenous injection.

TIME AFTER INJECTION:
2 hours.

INSTRUMENTATION:
GE Starport 400.

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