Case Report

A Case of Malignant Fibrous Histiocytoma Which Responded Completely to Thermoradiotherapy

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Abstract: This report discusses a patient with malignant fibrous histiocytoma (MFH) who was successfully treated with thermo-radiotherapy. The patient was treated with 48 Gy of radiotherapy and 4 sessions of hyperthermia. He displayed a tumor on his shoulder which reached a maximum size of 13 cm. The tumor size gradually decreased after the end of the treatments, and 5 months later the tumor had completely disappeared. There has been no recurrence for 18 months.

Key Words: malignant fibrous histiocytoma, soft tissue sarcoma, theramoradiotherapy, hyperthermia

Introduction

Historically, radical surgical resection either as a compartmental resection or as an amputation was the accepted treatment for soft tissue sarcoma[1-8]. MFH is one of the most commonly occurring soft tissue sarcomas, however, and there are many situations in which surgical resection is difficult due to tumor size, location, etc. However, MFH is resistant to radiotherapy alone[9], which suggests that another treatment modality should be available to use in combination with radiotherapy. Hyperthermia has been reported to enhance the effect of radiotherapy and/or chemotherapy for this refractory disease.

This report describes a case of MFH which was successfully treated with thermo-radiotherapy.

Case report

A 58-year-old male was referred to our hospital for the purpose of applying hyperthermia to a tumor on his left shoulder in February, 2006. An operation on the tumor had been performed in March, 2003, and it was diagnosed as MFH. The tumor recurred in February, 2004. Another surgery was suggested, but the patient refused. At this point, the patient underwent hyperthermia treatment in another hospital for 2 months. Hyperthermia was effective and the recurrent tumor disappeared, but it recurred again in October, 2004. Hyperthermia was applied again from May, 2005 for 5 months, however, the tumor progressed. At this point, the patient came to our hospital to augment the hyperthermia treatment with the addition of radiotherapy.

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doi: 10.3191/thermalmed.24.27

On the first examination, the patient had a huge tumor measuring 13 cm in diameter on his left shoulder, and the tumor had invaded into the underlying muscles. The tumor was not completely covered with skin, and a considerable amount of blood was oozing from the ulcers. Laboratory data showed that his hemoglobin concentration was 8.0 mg/dl, and that his C-reactive protein value was 19.2 mg/dl, probably owing to inflammation within the tumor. His performance status was fair with some display of dyspnea and palpitation on exertion. After a consultation with a surgical oncologist, the patient refused an operation since he was a systems engineer and had to work with computers with both of hands. The standard treatment, resection of the deltoid muscle and/or amputation, would considerably jeopardize his future performance status. Therefore, radiotherapy combined with hyperthermia was planned.

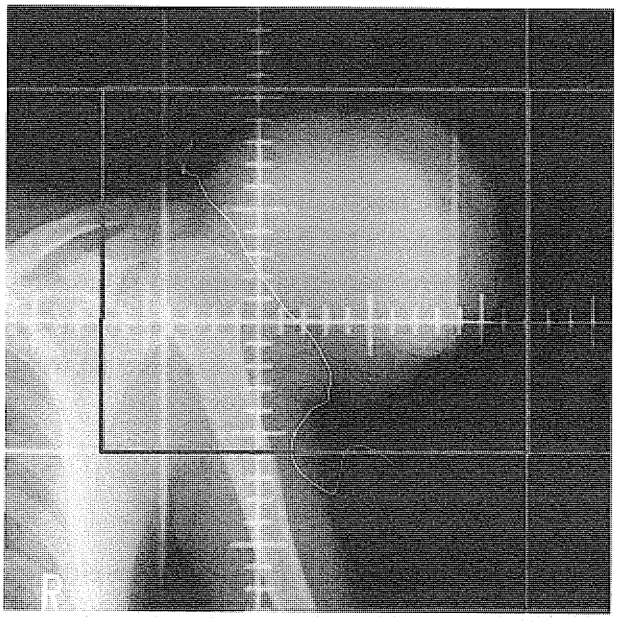

Fig. 1. Simulated image.

Treatment

After a written informed consent, the following treatment was used.

1. Radiotherapy

Radiotherapy for MFH was performed using a 6 MV X-ray, once a day, five times a week. A radiation dose of 3 Gy per fraction for a total of 48 Gy was delivered. Figure 1 shows a simulation of the patient's shoulder.

2. Hyperthermia

Hyperthermia was applied with a

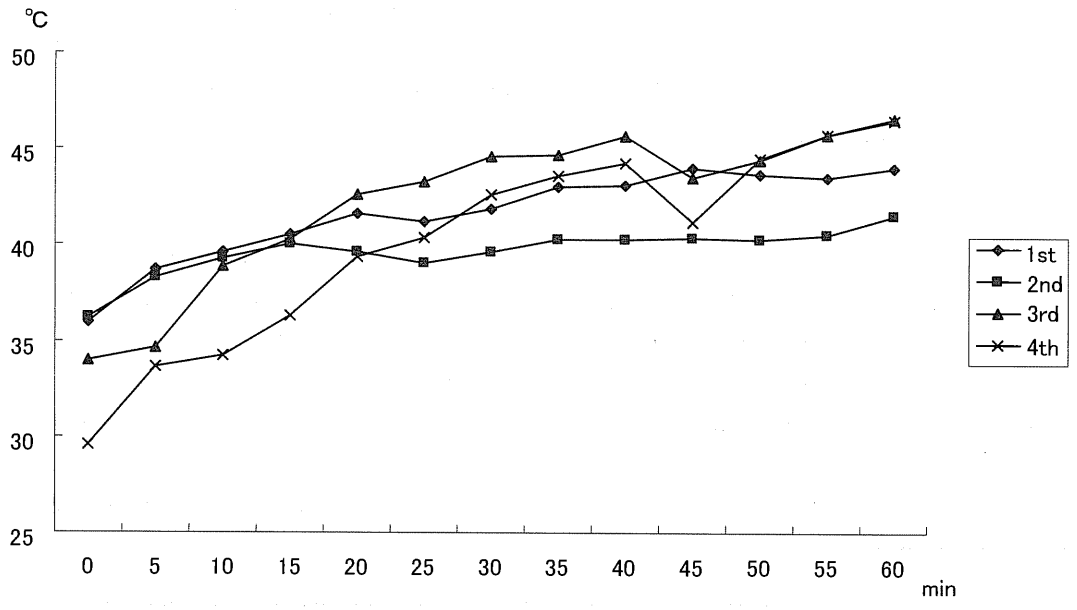

Fig. 2. Intratumor temperatures during hyperthermia.

RF-capacitive heating apparatus (Thermotron-RF8) soon after the radiotherapy, once a week. The sizes of the electrodes were 21 cm (upper and lower). Temperatures in the tumor were monitored by thermocouples which were placed inside of the tumor. The heating duration was 60 minutes while simultaneously maintaining intratumor temperatures at more than 42°C (Fig. 2). The total number of hyperthermia sessions was 4. The thermal parameter average values for Tmax, Tave, and Tmin were 48.5±0.49°C, 46.3±2.21°C, and 44.2±2.33°C, respectively.

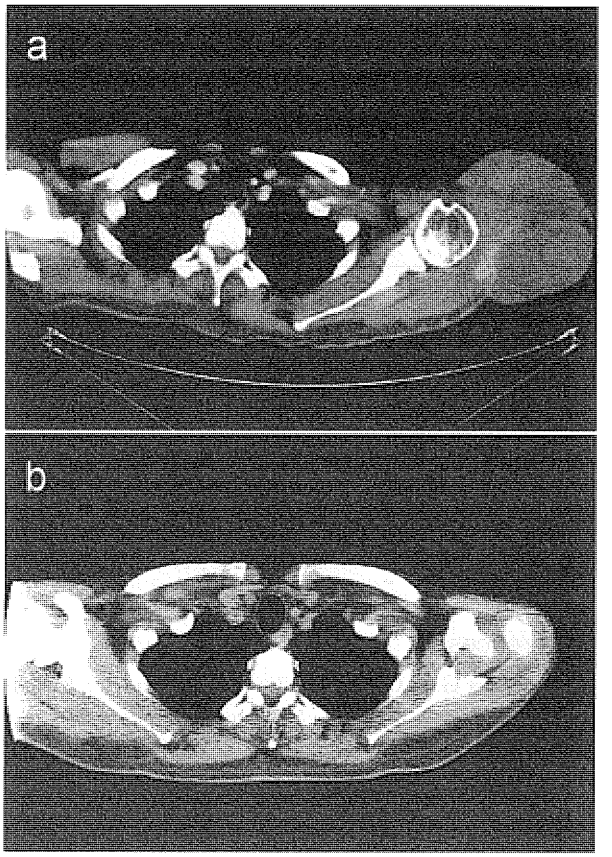

Fig. 3. CT image of the left shoulder. a, during thermoradiotherapy ; b, 10 months later after thermoradiotherapy.

Results

There was no change in the size of the tumor during thermo-radiotherapy. However, the tumor size gradually decreased after the end of the treatment, and 5 months later the tumor had completely disappeared (Fig. 3) and the left shoulder was covered with intact skin. No acute and chronic adverse effects have been observed so far. Before therapy, the patient had severe anemia and inflammation. His hemoglobin concentration and C-reactive protein values gradually returned to normal as the tumor decreased in size.

There was no disturbance in the range of his left shoulder motion 18 months after the treatment and the patient is alive and well without any clinical manifestation.

Discussion

We describe a case of MFH which was successfully treated with thermo-radiotherapy. In this case, the second hyperthermia treatment course had no effect on the second recurrence, although the first hyperthermia treatment course had been effective for the first occurrence. However, hyperthermia combined with radiotherapy has cured the second recurrence completely. This suggests that there was a beneficial effect from the combination of the two treatment modalities. In the past, we have treated 4 other MFH cases, all of which showed improvement after thermoradiotherapy (Table I).

MFH, like other soft tissue sarcomas, is very resistant to radiotherapy alone. Therefore, for cases with large unresectable masses, radiotherapy has been occasionally used, but only for palliative purposes. Hyperthermia has been shown to decrease the radioresistance of certain radioresistant tumors. As described in this case, even a tumor the size of a child's head completely disappeared after exposure to radiation with a dose range of 40 to 50 Gy, if the radiation was used in combination with hyperthermia.

Table I. Experience with MFH cases.

Case	Age	Sex	Part	Size (cm)	RT (Gy)	HT (fr)	Ch T	Resp	A/D (month)
1	78	M	rt. iliac bone	13×11	54	7	GEM	PR	18A
2	79	F	sacrum	14×12	50	3	−	SD	13A
3	65	F	mediastium	13×9	64	4	−	PR	20D
4	69	M	retroperitoneum	11×9	48	5	−	PR	15D
5	58	M	lt. shoulder	13×12	48	4	−	CR	22A

There are several other reports which also describe the effectiveness of thermoradiotherapy for MFH[10,11].

There are many situations in which surgical resection for MFH is difficult because of the tumor's large size, location, etc, although radical surgical resection has historically been the accepted standard treatment for MFH. However, a combined modality therapy consisting of radiotherapy and hyperthermia can be effective for treating MFH, and should be considered as a therapeutic option, especially in unresectable or inoperable cases.

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Abstract in Japanese

温熱放射線療法が奏効したMFHの一例

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要　　旨: 温熱放射線療法が奏効した悪性繊維性組織球腫 (malignant fibrous histiocytoma: MFH) の一例を報告する. 同症例に対し放射線治療として 48Gy の照射を行い, またこの放射線治療中に 4 回の温熱療法を合わせて行った. 症状として左肩に最大径 13cm の腫瘤形成を認めたが, 温熱放射線療法施行後, 腫瘤サイズは暫時縮小した. 照射後 5 ヶ月で腫瘍は完全に消失し, 照射 18ヶ月後でも再発は認めていない.