Palliation of recurrent myxofibrosarcoma with radiotherapy and hyperthermia

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ABSTRACT
Soft tissue sarcomas are rare biologically and histologically heterogeneous neoplasms that may arise throughout the body. The preferred treatment is total resection with a sufficient margin. Radiotherapy with or without chemotherapy offers another treatment option, but its effectiveness is limited. Hyperthermia, a treatment method that heats tumour tissue by exposing the target tissues to conductive heat sources or non-ionising radiation, is known to enhance the effect of radiotherapy. We report a case of an elderly man with a second recurrent myxofibrosarcoma in the left groin, who responded well to radiotherapy in combination with hyperthermia. This combination treatment was effective in maintaining the patient's quality of life during his remaining years.

Keywords: contralateral lymph node, hyperthermia, myxofibrosarcoma, palliative radiotherapy, recurrence

INTRODUCTION
Soft tissue sarcomas are biologically and histologically heterogeneous neoplasms that are rare and may develop throughout the body. The preferred treatment is surgery, but the prognosis is poor due to the high rate of local recurrence and distant metastases.1 Radiotherapy offers another treatment option for primary tumours and local recurrence, but its effectiveness is limited.2 Hyperthermia, a treatment method that heats tumours by exposing the target tissue to conductive heat sources or non-ionising radiation, is known to enhance the effect of radiotherapy.3 We report a case of an elderly man with local recurrence of myxofibrosarcoma who was not a candidate for resection or chemotherapy. He was treated with radiotherapy in combination with hyperthermia. This combined treatment was effective in maintaining the patient's quality of life (QOL) during his remaining years.

CASE REPORT
A 90-year-old man with a past history of cardiac infarction from six years before first presented at our hospital in May 2002 with a large tumour in his right thigh (Fig. 1). At presentation, he was not on any medication other than those for insomnia. Preoperative examination indicated no nodal or distant metastases. The tumour was then resected at our hospital. Histology revealed a high-grade myxofibrosarcoma with a questionable margin, but the patient did not give his consent for adjuvant therapy.

Fifteen months after the resection, the tumour recurred in the right inguinal region (Fig. 2). The patient was then referred to a provincial cancer centre, where he underwent a second resection with curative intent after preoperative irradiation of 25.0 Gy in ten fractions. The postoperative margins were negative.

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Fig. 1 Coronal T2-W MR image of the patient at first presentation shows a large tumour in the right thigh (arrow).

Fig. 2 Non-contrast CT image, performed 15 months after the resection of the primary lesion, shows a recurrent tumour in the right inguinal region (arrow).
Approximately ten months after the second resection, the patient noticed a painful nodule in the left inguinal region. A computed tomography (CT) examination (Fig. 3) was performed, which revealed a left-sided inguinal tumour. It was diagnosed as a recurrence by biopsy. The patient was again referred to the provincial cancer centre, but no curative treatment was proposed because of the higher risks associated with a third resection in an elderly man with a comorbidity of prior infarction. In addition, neither the patient nor his family wanted any invasive treatments. Hence, he returned home to spend his remaining time with his family for as long as possible, receiving palliative care at our nearby hospital.

On his first follow-up visit to our hospital, the patient looked quite well. His Kamoński’s QOL index was 60%, and there were no visceral metastases on the radiological examination for restaging. As local tumour control seemed to have maintained his QOL, radiotherapy was proposed with adjuvant local hyperthermia on an outpatient basis. With the consent of both the patient and his family, he received an anterior 4-MV X-ray irradiation of 30.0 Gy in 25 fractions and an additional 15 MeV electron irradiation of 20.0 Gy in ten fractions, totalling 70.0 Gy in 35 fractions over 57 days. On CT, the irradiation field was confined to the tumour, with a 1-cm margin. Hyperthermia was started once a week for an hour with a 13.56 MHz radiofrequency apparatus, using two opposed 20 cm φ electrodes at 100–200 W shortly after each irradiation. During hyperthermia, the tumour temperature was measured three times directly by CT-guided tumour puncture, and the maximum tumour temperature was 40.0°C, 41.2°C and 40.1°C at each measurement. Although the patient occasionally complained of a hot sensation or pain at the heating site during hyperthermia, these complaints remitted with control of the heating power or heating devices.

Although no change in tumour size was noted on completion of the treatment regimen, the patient did not complain of pain in the left inguinal region or report any symptoms associated with the treatments. Four months later, his family noticed a right-sided inguinal nodule. CT imaging was performed (Fig. 4), which revealed a recurrent tumour in the right inguinal region but complete remission of the left inguinal tumour. On biopsy of the right inguinal tumour, it was diagnosed as a recurrence, and the patient was again referred to the provincial cancer centre. Keeping in mind his previous history of preoperative radiotherapy for the first recurrence of the right inguinal lesion, radiotherapy or invasive treatments were not proposed. Therefore, only observations were continued at the patient’s home. 12 months after completion of the treatments, a final follow-up CT imaging was performed, which showed an increase in the size of the right inguinal tumour, but no tumour was found in the left inguinal region. The patient finally died of an intestinal obstruction caused by pelvic extension of the right recurrent inguinal tumour in January 2006, three-and-a-half years after the first operation. From the beginning of radiotherapy with hyperthermia until the final follow-up CT study (a 14-month period), the patient’s QOL remained almost unchanged, with no remarkable complications associated with these treatments. An autopsy was not performed.

**DISCUSSION**

The primary treatment for a soft tissue sarcoma is surgery, which has a five-year survival rate of less than 25%. 1) When surgery is contraindicated, radiotherapy with or without chemotherapy is an alternative, but its effectiveness for curative treatment
Although we could not obtain histological confirmation of lymph node metastasis using specimens from both the inguinal regions, the recurrent tumour in the left inguinal region in our patient was thought to be contralateral nodal metastasis, which occurred via the lymphatic system from the right inguinal nodal metastasis of the primary lesion. On the other hand, cases of contralateral nodal metastases have been reported for breast\(^5\) and vulvar cancers. This phenomenon has been attributed to the rerouting of the lymphatic drainage by ipsilateral nodal metastases\(^6\) or postoperative/post-radiation collateralisation of the lymphatic system.\(^6\)

Finally, the third recurrence occurred near the primary site, and the patient died of the disease three years and six months after the initial resection. During the radiotherapy and hyperthermia treatment regimen, he visited our hospital every day but was able to spend almost the entire day at home. Furthermore, from completion of the treatment regimen till the final follow-up CT study, the patient was able to live fairly well with his family. The 14-month interval between initiation of radiotherapy in combination with hyperthermia and the last visit for the follow-up CT study constituted over one-third of his survival from the first operation. We believe that effective local control can prolong life and maintain the QOL of patients for a relatively long duration, and that radiotherapy with hyperthermia is an option to control the local recurrence of soft tissue sarcoma without degrading the patient’s QOL.

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