Case Report

Thermo-radiotherapy Plus Chemotherapy and Hyperbolic Oxygen Therapy for Vertebral Metastasis with Paralysis from Rectal Cancer : A Case Report

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Abstract : We report a patient with paralysis and severe lumbago due to a vertebral metastasis from rectal cancer, who was successfully treated with thermo-radiotherapy plus chemotherapy and hyperbolic oxygen therapy. The patient underwent 40Gy of radiotherapy, 12 sessions of hyperthermia and 16 sessions of hyperbolic oxygen therapy combined with weekly chemotherapy. His symptoms were gradually improved after start of the treatment, lumbago was relieved at the end of radiotherapy, and he became ambulatory. The patient was also treated for other distant metastases with radiotherapy, hyperthermia and chemotherapy continuously with keeping good quality of life during eight months after the completion of the treatments for vertebral metastasis. Combination of radiotherapy, hyperthermia, chemotherapy and hyperbaric oxygen therapy may be effective for complete paralysis due to vertebral metastasis in inoperative cases.

Key Word : bony metastasis, hyperbolic oxygen, hyperthermia, paralysis, radiotherapy

Introduction

Bony spinal metastases from malignant tumor often severely limit the quality of life (QOL) due to severe pain and neurological deficits[1-11]. Therefore whether relaxation for the symptom, especially paralysis from spinal metastasis is successful or not is very important for activities of daily of life (ADL) of the patient. Many successful surgical salvage treatments for paralysis of spinal metastasis have been reported[7-10], but the indication for surgical treatment is limited for patients who prospected to some extent survival. Though in many patients with paralysis due to spinal metastasis, emergency radiotherapy is often required[1-5], there are few patients with surgical indication.

We herein report a case with functional recovers from state of lower extremity paralysis with dysuria by the combined modality therapy mainly on thermo-radiotherapy.

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Case report

A 55-year-old man was referred to our hospital for the purpose of radiotherapy for bony metastasis of the 4th lumbar vertebral arch in October, 2003. Operation for a progress rectal cancer was performed in April, 2003. Intra-arterial injection treatment (5-fluorouracil/Leucovorin) for liver metastases was started immediately after the operation. Systemic chemotherapy was also added with irrrinotecan for lung metastases from July, 2003.

He complained of lumbago in September, 2003 and in a week total abasia was developed. MRI imaging demonstrated metastatic bone tumor at the 4th lumbar vertebral arch (Fig. 1). Surgical treatment had no indication because of multiple distant metastases.

Neurological findings at the first visit included complete paralysis with complete sensory loss of the right lower extremity, paresis with mild hyposensitivity of the left lower extremity, and urination disorder. Severe lumbago was ineffective with a nonsteroidal analgesic.

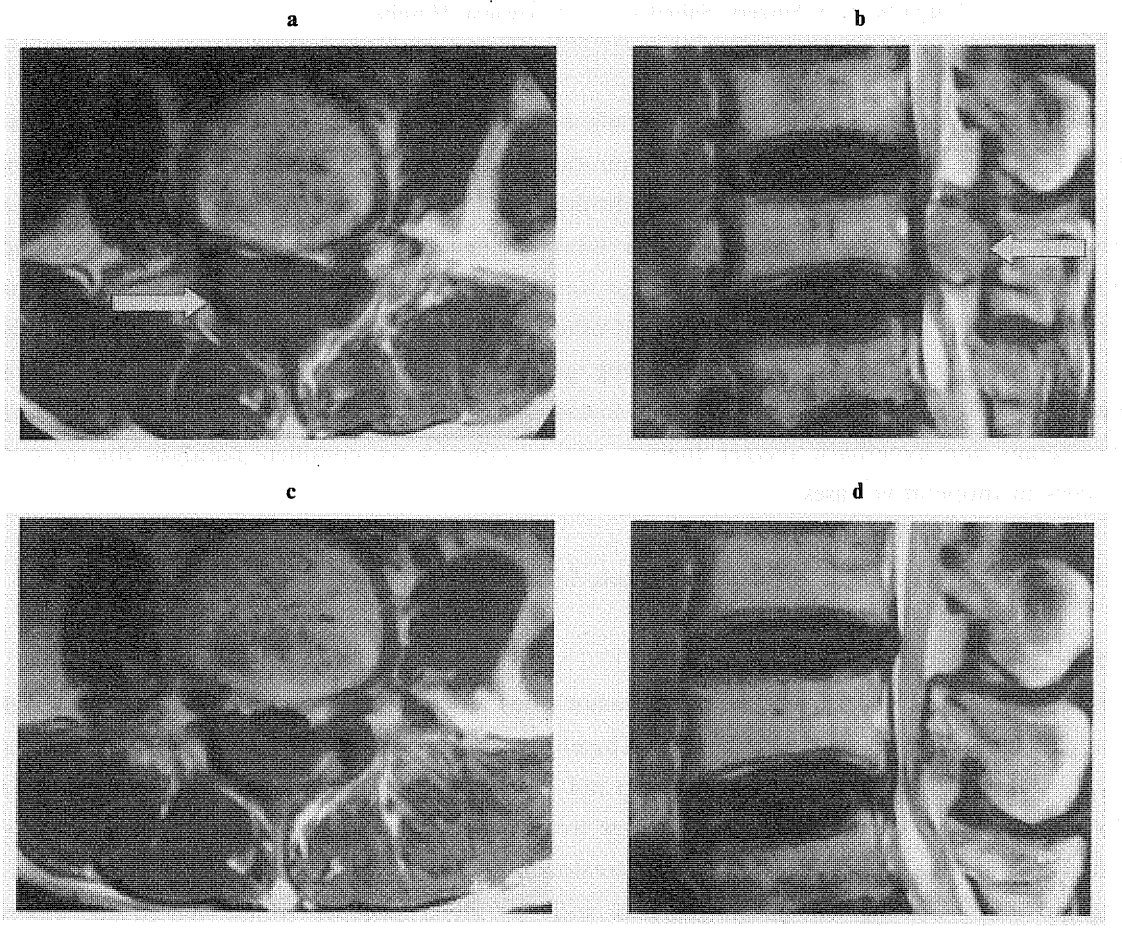

Fig. 1. MR images of the lumbar spine. a, b) pretreatment; the tumor at the 4th lumbar vertebral arch (arrow) is seen with compression of the dural sac. c, d) the tumor markedly diminishes in size four months after the end of treatment.

Treatment

1. Radiotherapy

Radiotherapy for bony metastasis of the 4th lumbar vertebral arch was performed using 4 MV X-ray with pendular method, once a day, five times a week. As for the first day, 10Gy was irradiated, and pendular radiotherapy with 2 Gy per fraction, total dose of 40Gy was given from next week.

2. Hyperthermia

Hyperthermia was applied with RF-capacitive heating apparatus (Thermotron RF-8 ; YAMAMOTO VINITA company Ltd, OSAKA JAPAN) within 30 min after radiotherapy once a week. The out-put power was about 1200W and heating duration was 50 min. Total number of treatments was 12 times (five times with radiotherapy including the first day, and seven times after completion of radiotherapy). Both upper and lower electrodes were 25 and 30cm in diameter, placed on opposite sides of the tumor region in prone position. For cooling of the skin surface, the overlay boluses were applied in addition to regular boluses attached in front of the metal electrodes.

3. Hyperbolic oxygen therapy

A total of 16 sessions of hyperbolic oxygen therapy with 2.5 atmospheres and 90 minutes was performed within 30 min after hyperthermia from the first day during the course of radiotherapy.

4. Steroid therapy

In the first day, 4 mg of betamethasone sodium phosphate was given by intramuscular administration before 10 Gy radiotherapy of. From the next day, betamethasone sodium phosphate via the oral route was administrated for two weeks and then tapered.

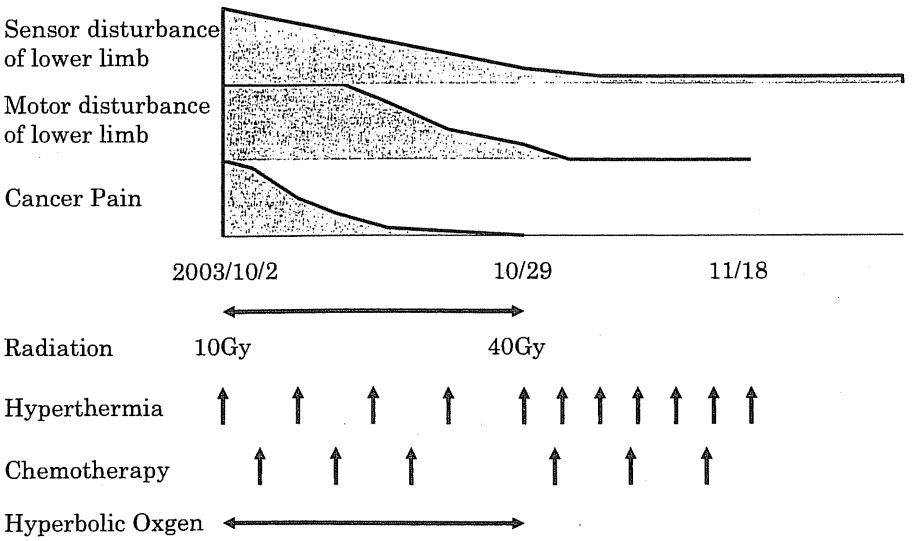

Fig. 2. Clinical course of the patient

5. Chemotherapy

Weekly chemotherapy for liver and pulmonary metastases was continued during the radiotherapy. CPT-11 (150mg/body) was administrated for systemic chemotherapy, and 5-FU (500mg/body) was for intra-hepatic arterial injection treatment with calcium levofolinate (LV) (400mg/body) for liver metastases.

The clinical course is shown in Fig. 2. Symptoms were gradually improved after start of treatment. At the end of radiotherapy his lumbago was relieved and he became ambulatory. Neurological findings were also markedly improved, although minor weakness in the right lower extremity and minor degradation of the right thigh were left. Urination disorder was completely improved at the end of radiotherapy. The tumor of the 4th lumbar vertebral arch was reduced in size, with relief of compression of the dural sac on MRI (Fig. 1)

After the completion of the treatment for the bony metastasis of 4th lumbar vertebral arch, he received thermo-chemotherapy for the pulmonary and liver metastases and thermo-radiotherapy for lymph node metastases of para-aortic and pelvic regions. His ambulant function as well as ADL was maintained with good QOL until October, 2004, when he died of vesicointestinal fistula due to the tumor invasion.

Discussion

Neurological disorders from spine bony metastases affect functional capacity of the patients significantly[1-11]. As a result, ADL and QOL of the patient are damaged, and therefore, it is difficult to continue the cancer therapy. In this case, however, successful treatment for abatic paralysis led to afterward continuation of the cancer therapy, and good ADL and QOL of the patient was maintained during his survival.

A golden hour for treatment of spinal cord compression due to vertebral metastasis is considered less than 48 hours after paralysis developed[2)3)10)]. In addition, it is thought that paralytic degree and radiosensitivity of primary lesion are also the factors related to the effectiveness of radiotherapy[1)]. In our previous investigation, only two cases of 28 cases with abatic paralysis became ambulatory after radiotherapy[12)]. In this case, paralysis improved, nevertheless therapy started eight days after occurrence of dysbasia and primary rectal cancer was not radiosensitive. Radiotherapy alone is usually not useful to reduce the metastatic tumor of the bone from radioresistant rectal cancer[1)]. Since usefulness of thermo-radiotherapy for the recurrent rectal cancer has been reported[12-15)], we supposed that thermo-radiotherapy could be effective for the bony metastasis from rectal cancer. Although there has been no report regarding the effectiveness of hyperbaric oxygen therapy for myelopathy due to malignancy, its usefulness for traumatic myelopathy has been reported[15-17)]. In addition, there is a possibility that continuous chemotherapy for distant metastases enhanced the effect of radiotherapy. Thus, we believe that the combined modality therapy probably affected the good results of this case. It could be another reason for good effect that the cauda equina, not the spinal cord, was compressed in this case.

Combined modality therapy consisted of radiotherapy, hyperthermia, chemotherapy and hyperbaric

oxygen therapy may be effective for complete paralysis due to vertebral metastasis even from radioresistant cancer, and should be considered as a therapeutic option in inoperative cases.

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温熱放射線治療と化学療法，高気圧酸素治療を施行した直腸癌骨転移による麻痺の1例

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要　　旨：直腸癌切除後の第4腰椎椎弓への転移性骨腫瘍に起因した癌性疼痛，下肢麻痺，排尿障害に対して，温熱放射線治療に化学療法，高圧酸素療法を併用し，症状の著明な改善が得られた一症例を報告する．

手術適応のない転移性骨腫瘍による脊髄障害に対して温熱療法を含めた集学的治療が有効であると考えられる．