

Palliative Radiation Therapy for Spinal Cord Compression from Metastatic Soft Tissue Sarcoma

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Abstract. *Aim: Spinal cord compression (SCC) from metastatic soft tissue sarcoma is a rare condition. Little is known regarding its optimal treatment. It is not clear whether these patients should receive radiation therapy alone or neurosurgery plus radiation therapy. This study focused on outcomes of patients with SCC from soft tissue sarcoma after radiation therapy alone. Patients and Methods: The effect of radiotherapy on pain relief and motor function and overall survival were evaluated in four patients. Results: Complete pain relief was achieved in two (50%) and overall pain relief in three patients (75%). Motor function remained unchanged in all patients. Overall survival rates at three and six months following irradiation were 25% and 25%, respectively. Conclusion: Radiotherapy alone resulted in high rates of pain relief in patients with SCC from metastatic soft tissue sarcoma. The effect on motor function was less favorable. Upfront neurosurgery is required for improvement of motor deficits.*

Spinal cord compression (SCC) caused by vertebral metastasis from metastatic soft tissue sarcoma is a rare emergency situation in oncology (1, 2). Since this situation is comparably uncommon, very little is known regarding optimal treatment approach for these patients. Most oncologic patients developing SCC receive radiation therapy alone supplemented by corticosteroids (2). According to a matched-pair analysis, the addition of upfront decompressive neurosurgery plus stabilization resulted in a higher rate of improvement of motor function in patients with SCC from an unfavorable or little radiosensitive cancer including renal cell carcinoma, colorectal cancer, cancer of unknown primary and non-small cell lung cancer (28% vs. 19%,

$p=0.024$) (3). Patients with SCC from a soft tissue sarcoma were not included in that matched-pair analysis, although sarcomas are considered relatively radioresistant. Thus, it is still not clear whether patients with SCC from a sarcoma should be treated with radiation therapy alone or a combination of upfront neurosurgery and radiation therapy. The present study focused specifically on the outcomes of patients with SCC from metastatic soft tissue sarcoma who were treated with radiation therapy alone.

Patients and Methods

Data of four patients treated with palliative radiotherapy for SCC due to vertebral body metastases from soft tissue sarcoma were retrospectively investigated for the effect of radiotherapy regarding pain relief and improvement of motor function and for overall survival. Median age was 30 years (range=18-79 years). Further patient characteristics of this cohort are summarized in Table I.

Pain was evaluated prior to radiotherapy and at one month following radiotherapy with an analogue scale ranging from 0 (no pain) to 10 (maximum pain) points. Partial pain relief was defined as improvement of two points on that scale, complete pain relief as 0 points at one month after radiotherapy. Motor function was evaluated prior to radiotherapy and at one month following radiotherapy with a scale according to Tomita *et al.* including the following four categories: 0=normal strength, 1=ambulatory without aid, 2=ambulatory with aid, 3=not ambulatory (4). Improvement of motor function was rated as a change of at least one category. The 3-month and 6-month overall survival rates were calculated using the Kaplan-Meier analysis (5).

Results

Pre-radiotherapy pain scores were 5, 7, 8 and 8 points, respectively. Complete pain relief was achieved in two patients (50%), and partial pain relief in another patient (25%). Thus, overall pain relief was 75%. Motor function was unchanged at one month following radiotherapy in all patients. Thus, none of the three patients who were not able to walk prior to radiotherapy became ambulatory after treatment. Median overall survival was 3.0 months, and the overall survival rates at three months and at six months following radiation therapy were 25% and 25%, respectively.

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Key Words: Soft tissue sarcoma, metastatic disease, spinal cord compression, palliative radiotherapy alone, treatment effect.

Discussion

The interest of research in the treatment of soft tissue sarcomas has further grown during recent years including new aspects of radiation therapy, chemotherapy and surgery (6-11). An improvement regarding the prognosis of patients with a soft tissue sarcoma will consecutively result in longer survival times. With prolongation of the survival time the risk of developing distant metastases increases. This will also apply to less common situations such as SCC as a consequence of vertebral body lesions. Currently, there is a lack of data with respect to optimal treatment of these patients, namely the question whether radiation therapy alone is sufficient or whether additional neurosurgery is required. The present study investigated the effect of irradiation on pain relief and improvement of motor function as well as overall survival in patients with SCC from metastatic soft tissue sarcoma who had received radiation therapy alone. Radiation therapy resulted in a high rate of overall pain relief (75%). Pain relief was complete in 50% of the patients. In contrast to these very good results, the effect of radiation therapy on motor function was less favorable. No patient experienced an improvement of his motor deficits. Therefore, it appears reasonable to perform decompressive neurosurgery prior to radiation therapy, which has been shown to improve functional outcome in patients with SCC from other relatively radioresistant tumors (3). In a previous randomized trial, patients treated with upfront neurosurgery must have had a survival prognosis of at least 3 months (12). The survival prognoses of patients presenting with SCC vary considerably depending on the type of primary tumor (13-16). In the present study, three patients (75%) died within 3 months following radiation therapy. However, if radiation therapy alone is not leading to improvement of motor function and recovery of walking ability, additional neurosurgery should be considered even for patients with an expected survival time of less than 3 months. If a patient cannot receive neurosurgery due to other limitations and comorbidities, radiation therapy alone appears a reasonable option for pain relief.

In conclusion, radiotherapy alone led to high rates of overall and complete pain relief in patients with SCC from metastatic soft tissue sarcoma. The effect on motor function was less favorable. If an improvement of motor deficits is intended, upfront neurosurgery is required.

Conflicts of Interest

On behalf of all Authors, the corresponding Author states that there are no conflicts of interest related to this study.

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Table I. *Patients' characteristics.*

Characteristic	N
Gender	
Female	2
Male	2
Interval from diagnosis of sarcoma and SCC	
<15 months	2
≥15 months	2
Time of developing motor dysfunction	
≤7 days	3
>7 days	1
Number of affected vertebrae	
4	2
9-10	2
Further osseous metastases	
No	0
Yes	4
Visceral metastases	
No	1
Yes	3
Pre-radiotherapy walking ability	
Able to walk	1
Not able to walk	3
Performance status	
ECOG 2	1
ECOG 3-4	3
Radiotherapy regimen	
5x4 Gy in one week	2
10x3 Gy in two weeks	2

SCC, Spinal cord compression; ECOG, Eastern Cooperative Oncology Group.

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