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Effectiveness of radiotherapy for metastatic spinal cord compression in patients with short life expectancy



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ABSTRACT

Aim: To analyze the effect of radiotherapy (RT) in patients with metastatic spinal cord compression (MSCC) and poor prognosis in our center.

Background: RT is an effective treatment for MSCC.

Materials and methods: Prospective evaluation on patients with MSCC and limited survival (according to Rades' scale), and treated with single-dose 8 Gy RT (February 2013–August 2014). Pain, ambulatory status and sphincter control were recorded. Pain relief was evaluated following the International Bone Metastases Consensus Working Party Guidelines. Ambulatory status was evaluated with Frankel's scale. Spinal fracture and instability were recorded. Health aspects were evaluated via a short survey and measuring the time spent on RT.

Results: 35 patients were included. 51% had unfavorable histologies; 60% bone fracture and 17% spinal instability. Median Karnofsky score was 60; 100% were on high doses of opioids. Median survival was 1.5 months. 49% had a partial pain response at 2 weeks post-radiation, and 47% at one month. Significant reductions in pain intensity were present at 2 weeks (Visual analog scale, VAS score, from 8 ± 1.5 to 5 ± 1.9). Negligible effects were observed on motor and bladder function, along with side effects. KPS score was maintained during follow-up. 80% of patients spent $\leq 5\%$ of their remaining lifetime on RT. A survey comparison between clinical judgment and the results according to treatment decision consider that these patients merit treatment evaluation.

Conclusions: A moderate pain response tailored to life expectancy can be obtained in patients treated with radiation. 8-Gy single-dose is an option for patients with limited survival.

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1. Background

MSCC is considered an oncologic emergency occurring in 5–10% of all cancer patients during their disease.¹ The majority of patients have a short survival of only a few months.^{2,3} Short-course radiotherapy (RT) administered in a week or less is associated with less discomfort and considered appropriate for patients with short life expectancy. Single fraction RT with 8 Gy results in similar pain relief and improvement of motor deficits in patients who receive radiation for MSCC^{4–8}.

The capacity of physicians to predict survival is controversial. This is reflected in a study evaluating the adequacy of palliative radiation treatment in end-stage cancer patients, where median survival was 15 days and survival estimates by the treating physician were correct in only 16% of patients.⁹ Objective prognostic systems can improve prognostic accuracy. A scoring system validated to estimate survival of MSCC patients, based on 6 prognostic factors that can be easily recorded, separates well those patients with higher 6-month survival expectancy from the rest.¹⁰ A modified version of this score, adding ECOG performance status to the prognostic factors, has been proposed to identify patients with MSCC and an extraordinarily limited life expectancy.¹¹

Little information is known regarding radiation use at the end of life. A study showed that 6–7% of patients receiving palliative radiation at the end of life died within 30 days post treatment.¹²

The first sign of MSCC is generally back pain.^{13,14} Common manifestations include weakness, sensory changes, and autonomic dysfunction. Although RT plays an important role in the management of MSCC, it is well documented that the symptomatic effect of radiation is lower in cases of vertebral fracture and spinal instability.

2. Aim

This study aimed to prospectively evaluate the potential effect of single dose RT in patients with MSCC and low survival expectancy.

3. Methods

3.1. Patients

Data from all patients diagnosed with MSCC from February 2013 to August 2014 at Vall d'Hebron University Hospital were analyzed. The eligibility criteria were: known history of cancer and estimated life expectancy less than 6 months; that the patient had not been treated previously at the compression level; and signed informed consent.

Diagnosis of MSCC was conducted with an MRI/CT of the entire spine in clinically suspicious patients, i.e. presenting with pain, weakness, sensory disturbance, and/or sphincter dysfunction. MSCC was defined as compression of the dural sac and its contents by an extradural tumor mass. The minimum radiologic evidence for cord compression is indentation of the theca at the level of clinical features.¹⁵ Radiology also allowed the identification of vertebral fractures and spinal

instability. Spinal instability was evaluated using the Spinal Instability Neoplastic Score (SINS), where higher SINS scores denote spine instability.¹⁶

Prognostic factors assessed for life expectancy include the type of primary tumor, presence of bone or visceral metastases at the time of RT, the interval from tumor diagnosis to MSCC, ambulatory status and time of developing motor deficits before RT. A score was assigned to each patient and three groups were established, as defined by Rades.¹⁰ Patients in groups I–II have a short life expectancy, and form this study's cohort.

This study was approved by the Ethical Review Committee at Vall d'Hebron University Hospital.

3.2. Treatment

Parenteral dexamethasone (16 mg/d) was administered from MSCC diagnosis until 5 days post-RT, and then progressively diminished. Non-responders continued taking corticosteroids as needed. Patients with fields covering the upper abdomen received parenteral 5-hydroxytryptamine-3 receptor antagonist 60 min before radiation treatment. The antiemetic was maintained as needed after radiation treatment. Emergency RT was planned to start within 24–72 h of the diagnosis and delivered from a 6-MV linear accelerator. One vertebral body above and below the involved vertebrae and paravertebral mass were included in the treatment portal.

3.3. Assessment

The response to treatment was evaluated according to the patients' back pain, walking capacity, and bladder function before and after RT. The pain intensity score and need of analgesics were recorded. On the basis of physical examination, motor performance was graded according to Frankel's scale, a system that considers a patient ambulatory if any useful motor function is present. Bladder function was defined by the need of a urinary catheter. Treatment toxicity was evaluated by the National Cancer Institute Common Terminology Criteria for Adverse Events version 4.0 (CTCAE v4.0). Analysis of response was performed 2 weeks after the end of RT and the follow-up examination was continued monthly until death. Clinical information was recorded by the treating physician at regular visits or with telephone interviews.

3.4. Response definition

Pain response was calculated using the International Bone Metastases Consensus Working Party Guidelines (IBCWP) which take into account changes in pain intensity and the administration of analgesics.¹⁷ A complete response was defined as a pain score of 0 without analgesic increase. A partial response was defined as (1) a decrease in the initial pain intensity ≥ 2 points on the Visual Analogic Scale, without analgesic increase; or (2) an analgesic decrease ($\geq 25\%$) without increase in pain. Progression of pain was defined as (1) an increase in pain ≥ 2 points above baseline, without analgesic increase; or (2) an analgesic increase ($\geq 25\%$), irrespective of the

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