Management of Metastatic Bone Pain: Preliminary Results with Single Fraction (4 Gy) Radiotherapy

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Results

17 sites (16 patients) were evaluable, whereas four sites (three patients) were not regarded evaluable because of a change of systemic therapy (two cases), a fracture of a long bone detected two days after irradiation (one case) or insufficient follow-up data (one case). 11 sites (11 patients) received a single treatment with 4 Gy without any further radiotherapy. Pain relief (= reduction of at least one point) was seen in five of 11 patients (45 %) resulting in a change of pain medication in four patients. In table 1 relevant data are listed. Pain relief occurred in both weight bearing and non-weight bearing bones. No retreatment was considered necessary during follow-up (median follow-up: three months; range two weeks to seven months). A second group of six sites (six patients; five new patients plus patient 10, table 1) was formed. As they did not respond to single irradiation, a second dose was administered two weeks later. Four of these six patients responded after this second irradiation.

Discussion

A variety of fractionation schedules can be recommended for patients with symptomatic bone metastases. Two extreme ways are possible: 1) single fraction irradiation (e.g. only one planned fraction) and 2) fractionated radiotherapy (e.g. 15–20 fractions). Standard fractionated radiotherapy is clearly superior in the treatment of patients with spinal cord compression,

Introduction

Pain is a major symptom in 70% of all cancer patients [5]. Osseous metastases often are the cause of pain. Therefore, in many cases radiotherapy is important to achieve pain relief. Various dose/fractionation schedules are recommended for palliation of symptomatic osseous metastases. Single fraction radiotherapy may be useful, especially in patients with poor prognostic factors. Following a suggestion of a British colleague (P. Price; personal communication) we undertook a pilot study, using 4 Gy single fraction palliative radiotherapy.

Patients and Methods

Between January and October 1988, 21 patients with symptomatic osseous metastases were treated with a single 4 Gy fraction to reduce pain. Patients were excluded if a fracture of a long bone was causing the pain and vertebral metastases were the origin of patients distress. The latter were irradiated with standard fractionation radiotherapy. 21 sites in 20 patients with known malignant tumors were treated with a single portal (telecobalt or electron field) or two parallel opposing fields (telecobalt or 10 MV photons of a linear accelerator) with a prescribed dose of 4

Gy in one treatment session. Pain evaluation was based on a four point pain scale (0 = none; 1 = mild; 2 = moderate; 3 = severe) by asking the patients at regular intervals. Furthermore pain medication was registered. Endocrine or cytostatic treatment was not changed six weeks prior till six weeks after the irradiation. Two groups of metastatic sites were formed, those with metastases of weight bearing bones (spine, pelvis, extremities) and those with metastatic involvement of non-weight bearing bones.

Table 1, Summary of 11 patients treated with single fraction irradiation

Patient	Age/Sex	Site of primary tumor	Weight bearing bone	Severity of pain pre	Severity of pain post	Pain medication Follow-up (week 1) (week 4)
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62 m		lung		3	3	continued died 2 weeks later
70 f		lung		2	2	continued died 3 weeks later
79 m		bladder		2	2	continued died 3 months later
73 m		prostate		1	1	reduced died 6 months later
69 f		thyroid				

+
2
2
2
increased
died 8 months later
40 m
CML
-
2
1
0
stopped
alive 4 weeks
78 f
breast
-
2
2
2
continued
alive 6 weeks
61 m
lung
-
2
1
1
reduced
died 3 months later
78 m
lung
-
2
2
2
continued
alive 5 months
47 f
breast
-
2
2
2
continued
alive 5 months

60 f
breast

-

1

0

0

stopped

alive 7 months

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Short Communication/Kurzmitteilung

a pathologic fracture or in whom the prevention of symptoms likely to occur in the near future (< prophylactic palliation >) is necessary. From a large multicenter trial of the Radiation Treatment Oncology Group [1] it was concluded, that a protracted dose fractionation schedule (15 fractions) is more effective than a short course schedule (5 fractions). In patients with poor prognostic factors, however, short course regimen or even single fraction radiotherapy may offer acceptable palliation. The first question should be directed to optimum single dose. Price et al. [2] presented for the first time results of a prospective study using a single dose with 8 Gy. Depending on the site of irradiation and also the size of the irradiated volume, side effects and even possible risks are not always neglectable within this dose range. In this situation, 4 Gy single fraction may be more appropriate. Our pilot study shows an acceptable degree of pain relief, comparable with the pilot study recently published by Price et al. [3]. A second question shall be addressed; that is the question whether in patients not responding to single fraction radiotherapy the administration of more fractions is beneficial. Though patient numbers are small, we conclude from our preliminary analysis that a second fraction after one or two weeks is improving pain relief. This finding is in contrast to Price et al. [3], who observed no significant pain relief by adding a second treatment in seven patients, who had not responded to the first treatment. Another possibility has been proposed by Shepherd [4]; in a small pilot study (13 patients) different methods to investigate pain relief have been analyzed using 6 or 8 consecutive fractions with 4 Gy. Three of five patients treated with this regimen responded. The effect of 4 Gy single fraction radiotherapy has been demonstrated in patients with painful bone metastases; whether additional fractions in weekly intervals may improve pain control is still an open question.

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