

Analgesic radiation therapy for bone metastasis in Dakar

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Abstract

Background: Three-dimensional conformal radiotherapy is a new tool in the Senegalese therapeutic arsenal. Symptomatic bone metastases affect the quality of life of patients. Analgesic radiotherapy is proposed to patients to relieve them.

Patients and methods: A prospective descriptive study was carried out on all patients with symptomatic bone metastasis. Hypo-fractionated radiotherapy was performed on the painful site. The visual analogue scale was used to assess pain before radiotherapy, 72 hours and one week after. Results: The sex ratio was 0.5. The median age at diagnosis of symptomatic metastasis was 53 years. All patients received 8 Gy (Gray) in one session. A complete response was noted one week post radiotherapy.

Conclusion: Analgesic radiotherapy improves the quality of life of patients with symptomatic bone metastasis.

Keywords: Bone metastasis; Radiotherapy; Pain; Quality of life

1. Introduction

Bone metastasis occurs in approximately two-thirds of cancer patients. After the lung and liver, bone is the most common metastatic site [1]. Bone metastasis is an important cause of morbidity and impairs the quality of life of patients, particularly because of pain [1]-[3].

Analgesic radiotherapy is integrated into the management of bone pain in the same way as surgery and medical treatments following the multidisciplinary consultation meeting. It is effective with very few side effects [4], [5].

Previously poorly known in our work setting, practitioners are increasingly referring patients for analgesic radiotherapy.

We conducted a prospective study in our department to evaluate the effectiveness of analgesic radiotherapy.

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2. Patients and methods

2.1. Patients

All patients received in the department for one or more symptomatic bone metastasis regardless of the primary location.

2.2. Non-inclusion criteria

All patients with asymptomatic bone metastasis;

Symptomatic non-bone metastasis.

Primary bone cancers

2.3. Type of study

Single-centre prospective descriptive study of 06 months (July to December 2018).

2.4. Location

Radiotherapy department of the Dalal Jamm National University Hospital with two ELECKTA 10 MEV linear accelerators.

2.5. Pain assessment, treatment and follow-up

Pain assessment is done by visual analogue scale before and after radiotherapy [6].

All patients were consulted, simulated, bypassed and treated with hypo-fractionation in one session on the same day.

Patients were seen in consultation 72 hours after radiotherapy and one week afterwards a telephone consultation was made.

2.6. Definition of response criteria

The efficacy of radiotherapy on pain relief is defined according to Chow et al [7].

Table 1 Definition of response to palliative irradiation according to Chow et al

Complete response	Pain score = 0 at the treated site Without concomitant increase in analgesic consumption, which remained stable or decreased
Partial response	Reduction in pain score ≥ 2 at the treated site without increase in analgesic consumption or decrease in analgesic consumption $\geq 25\%$ without increase in pain
Progression	Increase in pain score ≥ 2 at the irradiated site with stable pain medication consumption Or Increase $\geq 25\%$ in pain medication consumption with stable pain score ± 1 point
Undetermined response	Any response that does not meet the definition of a complete, partial or progressive response

2.7. Statistical analysis

The Sphinx software was used to calculate the mean, median and the number of participants (number and percentage).

3. Results

The characteristics of the patients are summarised in Table 2. Our radiotherapy department treated 298 patients of all stages over a period of six months. Of these patients, 19 were treated for symptomatic bone metastasis; that is, 06.38%. Seven patients did not return for consultation because of the difficulty of travelling by ambulance. 12 patients were finally retained. Females predominated with 8 patients (66.7%) out of 4 males (sex ratio: 0.5). The median age was 53 years with extremes of 37 and 83 years. Breast was the primary primary location with 6 cases (50%) followed by prostate with 2 cases (16.7%) and 1 case for endometrium, rectum, ankle and multiple myeloma. Ten (10) patients were under anti-cancer treatment; that is 83.3%. The lumbar location was the most frequent with 05 cases, followed by the dorsal location with 04 cases and the dorsolumbar location with 03 cases. The average pain assessment according to the visual analogue scale was 09/10. Nine patients had analgesic treatment prior to radiotherapy, i.e. 75% of patients without a complete response. Two patients had a partial response of short duration. All patients were seen in consultation, simulated, bypassed and set up for treatment on the same day. All patients received a single dose of 08 Gy of analgesic radiotherapy. Seventy-two hours after treatment, 07 patients had a partial response, 04 had no response and 01 had a total response. Four patients had a rebound effect after 72 hours of follow-up. One week after treatment, all patients had a complete response.

Table 2 Patient characteristics

Patient characteristics		Numbers N (%)
Age (years)	-40	2 (16,6)
	+40	10 (83,3)
Metastasis site	Dorsal	4 (33)
	Lumbar	5 (42)
	Dorso-lumbar	3 (25)
Radiotherapy technique	3D Conformational	12
Dose (Gy)	8	12
Analgesic after treatment	Yes	9 (75)
	No	3 (25)
Primary site	Breast	6 (50)
	Prostate	2 (16,7)
	Rectum, ankle, uterus, multiple myeloma	1 (33,3)
Ongoing chemotherapy		10 (83,3)

4. Discussion

The sex ratio in our study is 0.5. Bone metastases occurred more in women than in men in most studies [3], [8]. The series by Spencer et al. found no difference between men and women [9]. The median age at diagnosis of symptomatic bone metastasis in our study was 53 years. This was in agreement with the literature with a median age ranging from 52 to 67 years [3], [8].

The most common primary cancer site was breast, followed by lung and prostate [3], [8]-[10]. Our study seems to confirm these results: breast (50%), prostate (16.7%). It should be noted that in the published clinical trials, breast (35-45%), prostate (10-35%) and lung (10-35%) are the best described sites; the others (radiation-resistant and haematological tumours) are often excluded or not specified.

The spine was the first location irradiated in many studies [11] [12].

The study by Le Fèvre C, et al. found a preferential location in the spine in 59% of cases [1], [3]. Our study found an exclusively spinal location, preferentially lumbar.

All our patients were evaluated according to the visual analogue scale (VAS) at the initial consultation. This evaluation showed a median VAS of 9/10. European studies do not find the same value, 6 and 7 respectively [3] [13]. This can be explained by the fact that the patient is managed in the same centre. In our work context, patients are often followed by several services in different locations, which means that the prescription of analgesics is not uniform.

83.3% of our patients were on anticancer treatment (chemotherapy and/or hormonal therapy), in contrast to most studies of bone metastases [12], [14].

The Le Fèvre C et al. and Nielsen et al. studies found that 73% of patients were taking analgesics [3], [14]. It should be noted that in the Le Fèvre C, et al. study, 23% of patients were asymptomatic and 74% of them did not require analgesics [3].

Our study found the same proportion of patients taking analgesics, i.e. 75%. This contrasts with the study by Kaasa et al [15].

All our patients were seen in consultation, simulated, bypassed and treated on the same day contrary to the French studies [1], [3]. Several fractionation schemes can be used for the irradiation of uncomplicated bone metastases. Our therapeutic standard is a dose of 8 Gy in one session by three-dimensional conformal radiotherapy. In the study by Le Fèvre et al. 2 patients were treated by stereotaxis and the rest by 3D conformal technique. Treatment regimens varied: 30 Gy in 10 fractions, 20 Gy in 5 fractions and 8 Gy in 1 fraction. 20% of patients received treatment with 8 Gy in one session [3]. It should be noted that randomised studies and meta-analyses do not show any superiority between these treatment regimens in the management of uncomplicated bone metastases. Moreover, they show that the hypofractionated regimen was more commonly used by experienced radiotherapists [13], [16], [17], [14]. The study by Slotman et al. showed that the majority of patients preferred a one-day management [18].

Our study found a significant decrease in pain after treatment, i.e. VAS less than 3, in line with French studies [1], [3].

The rebound effect or "pain flare" is one of the acute complications of irradiation and corresponds to a paradoxical increase in pain at the irradiated site. It usually occurs after one to five days from the start of radiation and lasts for about three days. Its incidence is about 40% after three-dimensional treatment and may even reach more than 60% after stereotactic radiotherapy [19]-[23]. A rebound effect was found in 4 patients at 72 hours follow-up, controlled by corticosteroid therapy. In the study by Le Fèvre C et al, no rebound effect was observed [3].

Our study found a partial response in 58% of patients at 72 hours of treatment and a total response at one week in all patients. The efficacy of three-dimensional radiotherapy is reported to be between one and four weeks depending on the study [1], [3]. Some studies found efficacy at least 3 weeks [9], [24], [25].

This study, although prospective, shows some limitations related to the evaluation of medical analgesic treatments. Indeed, the patients received several analgesic treatment regimens defying all prescription logic. They went from first-tier to third-tier analgesics or even from a synergistic, unproductive second- to third-tier combination. There were also breaks in the supply of third-tier analgesics. All these facts could constitute points for discussion.

5. Conclusion

Analgesic radiotherapy is effective and easy to implement. It must be better popularised to improve the pain control of our patients. The limitations related to the prescription of analgesic drugs would require in-depth training and a larger multicentre prospective study could help to adapt the management of symptomatic bone metastases in our patients.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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