

Case Report

Cutaneous metastasis of prostate carcinoma treated with electron radiotherapy

Shigeki Arase,¹  Naoko Sanuki² and Hiroshi Matsuura¹

¹Department of Urology, and ²Department of Radiology, Mie Prefectural General Medical Center, Yokkaichi City, Mie, Japan

Abbreviations & Acronyms

CT = computed tomography
PSA = prostate-specific antigen

Correspondence: Shigeki Arase M.D., Ph.D., Department of Urology, Mie Prefectural General Medical Center, 5450-132 Hinaga, Yokkaichi City, Mie 510-8561, Japan. Email: shigeki-arase@mie-gmc.jp

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

Received 24 January 2019;
accepted 9 April 2019.
Online publication 9 May 2019

Introduction: Prostate carcinoma is typically diagnosed and treated, and it rarely manifests as cutaneous metastases. We herein report electron radiotherapy for the treatment of cutaneous metastases causing cellulitis, with a durable clinical response achieved.

Case presentation: A 70-year-old male patient with scrotal cutaneous metastasis of prostate carcinoma was undergoing treatment with docetaxel chemotherapy due to recurring cellulitis originating from the scrotum, and his treatment was interrupted. We administered electron radiotherapy to the scrotal cutaneous metastasis lesions, as irradiation was difficult, and obtained a good clinical effect. Subsequently, he continued chemotherapy, and the scrotal lesions remained clear and dry with no recurring cellulitis for 1 year.

Conclusion: Electron radiotherapy is one of the safe and effective treatment options for controlling cutaneous metastasis of prostate carcinoma.

Key words: cellulitis, cutaneous metastasis, electron radiotherapy, prostate carcinoma, scrotum.

Keynote message

Prostate carcinoma rarely manifests as cutaneous metastases. The patient complained of discomfort and a reduced quality of life, and the metastasis caused cellulitis, and treatment interruption. We obtained a good clinical effect by treating the spherical cutaneous metastasis lesions in the scrotum, where irradiation was difficult, using electron radiotherapy.

Introduction

Prostate carcinoma is typically diagnosed and treated, and it rarely manifests as cutaneous metastases. In the present case, a patient who was undergoing treatment for prostate carcinoma developed a cutaneous metastasis; he complained of discomfort and a reduced quality of life, and the metastasis caused cellulitis, and treatment interruption. We herein report electron radiotherapy for the treatment of cutaneous metastases causing cellulitis, with a durable clinical response achieved.

Case presentation

A 70-year-old male patient who had been initially diagnosed with prostate carcinoma 13 years earlier developed cutaneous metastasis (PSA 19 ng/mL, GS7, T3aN0M0). He had received antiandrogen therapy – with leuprolide and bicalutamide – and focused radiation for local control 12 years earlier. Following this therapeutic approach, the serum PSA levels had been maintained at 0.1 ng/mL for the subsequent 10 years. However, the serum PSA levels began to increase to 2.0 ng/mL 3 years ago, subsequently increasing to 4.32 ng/mL 2 years ago, and at the same time, the patient developed ulcer and nodular lesions on the scrotum (Fig. 1a). A clinical examination showed a reddish, nearly circular lesion with an irregular border that was roughly 10 cm in diameter. The lesion partially contained a thick induration

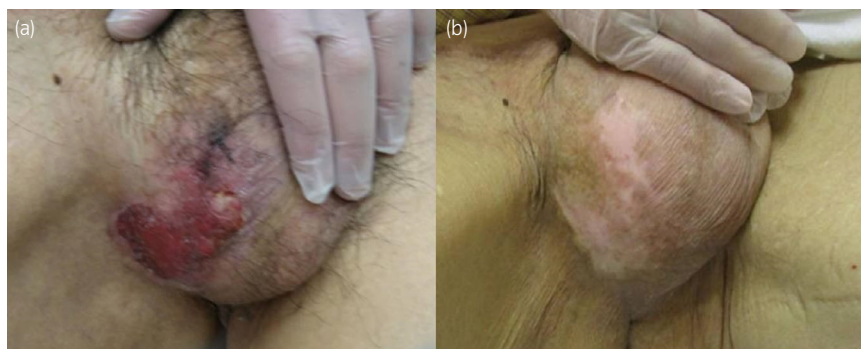


Fig. 1 (a) Scrotal cutaneous metastasis developed ulcer and nodular lesions. (b) The scrotal metastatic lesions disappeared after electron radiotherapy.

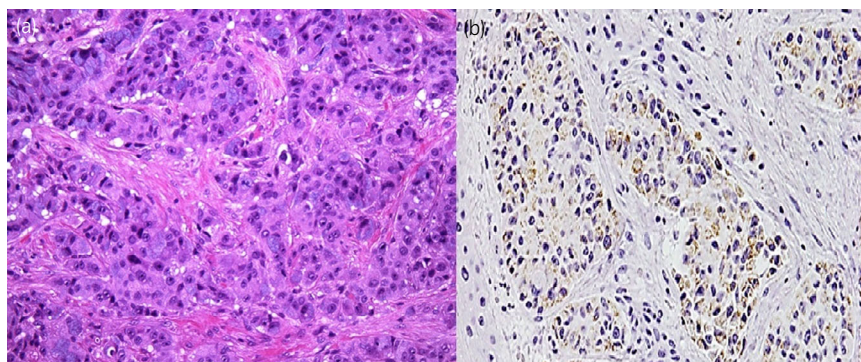


Fig. 2 (a) Dermal infiltrate-hematoxylin and eosin staining $\times 200$. (b) Dermal infiltrate was positive for P504S staining $\times 200$.

about 4 cm in size with a thickness of < 5 mm. A histological examination of a punch biopsy on a sample lesion showed the presence of metastatic adenocarcinoma in the dermis (Fig. 2a). Although the specimen did not stain for PSA clearly, it stained for P504S (Fig. 2b), which is consistent with prostate carcinoma. Following antiandrogen therapy, although the PSA levels became undetectable, bone metastasis was detected. The patient consequently underwent docetaxel chemotherapy, following which repeated cellulitis spread from the scrotum in the form of cutaneous metastasis. Treatment with local washing and inunction was ineffective. After consulting with a dermatologist and radiotherapist, we considered performing radiotherapy for infected lesion, as surgical treatment appeared to carry a high risk. Even if electron radiotherapy proved insufficient, the metastatic lesions would likely have been reduced in size, to the point that surgical treatment with a sufficient extent of resection might be possible.

Subsequently, we administered electron radiotherapy (total 60 Gy) to the spherical cutaneous metastasis lesions in the scrotum. As a result, the metastatic lesion responded well clinically disappeared. Skin toxicity such as moderate erythema and edema, and patch moist desquamation was observed; however, they were self-limited and resolved within 4 weeks.

After electron radiotherapy, the patient continued chemotherapy, and the scrotal lesions remained clear and dry (Fig. 1b), with no recurring cellulitis for 1 year.

Discussion

In prostate carcinoma, cutaneous involvement generally presents in the later phases of the disease and is associated with

a poor prognosis.¹ Indeed, the mean survival time following a diagnosis of cutaneous metastasis has been reported to be approximately 7 months, because a majority of these patients already have advanced disease.² Antiandrogen therapy and chemotherapy have been used to treat cutaneous metastasis,³ albeit without much success. It was recently reported that radiotherapy achieved a good response to cutaneous metastasis of prostate carcinoma.³ In the present case, cutaneous metastasis caused discomfort as well as a reduced quality of life and led to cellulitis, with treatment interruption. We herein report an effective treatment approach using electron radiotherapy that provided a durable clinical response for cutaneous metastases in the spherical scrotum.

Electron radiotherapy is typically performed for cutaneous carcinoma on the body's surface and cutaneous metastases.⁴ In such cases, this approach has the advantage of having a shallow and small radiation area, thereby preventing damage to the normal cellular organization surrounding the carcinoma.⁴ To achieve the peak electron beam dose of the peculiarity of the present case, the target volume was set by adding a 1.0- to 1.5-cm margin to the gross tumor volume. The planning target volume was then created with an additional 5-mm set-up margin on top of the clinical target volume. A custom lead block was made to encompass the planning target volume. A 5-mm bolus material equivalent of water density was applied to compensate the skin surface dose. Planning CT scan with the bolus in place was performed to simulate the dose distribution and aid in selecting the electron energy (Fig. 3). The patient received hypofractionated 6-MeV electron beam radiotherapy consisting of 20 fractions of 2 Gy for a total of 60 Gy, prescribed at the peak depth 1.2 cm. With accurate treatment planning and effective radiation therapy, we were able to successfully target the

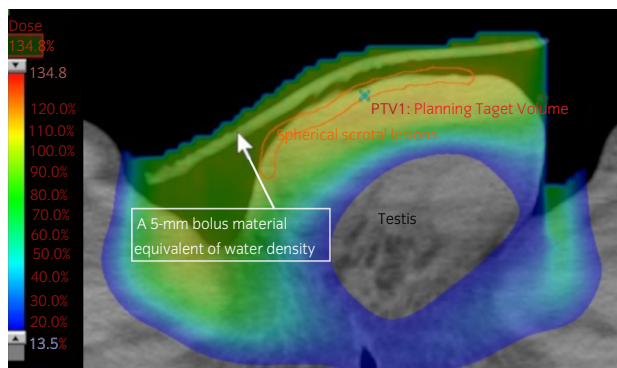


Fig. 3 A 5-mm bolus material equivalent of water density was applied to compensate the skin surface dose. Planning CT scan with the bolus in place was performed to simulate the dose distribution and aid in to selecting the electron energy.

margins. Cutaneous metastasis can be seen in any malignancy at various site of the body (e.g. scalp metastasis from breast cancer, nasal skin metastasis from lung cancer, etc). Distant metastasis is usually considered as systemic disease and local treatment need to be less invasive. Palliative radiotherapy is often indicated for such cases. Scrotal cutaneous metastasis was generally thought to be technically difficult to irradiate effectively due to its location. What was fortune for the current case was that the patient could open legs wide enough so as to let the scrotum flattened by manual traction of the scrotum with his hands and therefore be irradiated perpendicularly by electron.

Cutaneous metastasis of prostate carcinoma is present at an overall rate of 0.09% among patients with prostate carcinoma. In addition, there exists the possibility that a skin lesion may represent an undiagnosed metastasis.⁵ The number of prostate carcinoma has been increasing rapidly in recent years, and the development of cutaneous metastasis, as observed in the present case, appears to be increasing at a constant rate.

Castration resistance, a curative approach to prostate carcinoma, has seen a tremendous increase, thereby leading to higher expectations of long survival. A careful examination of the patient's skin must be performed when rashes or nodules are noted in patients with prostate carcinoma in order to promptly detect cutaneous metastasis and perform treatment.

Electron radiotherapy is one of the safe and effective treatment options for controlling cutaneous metastasis of prostate carcinoma.

Acknowledgments

We thank our patient for agreeing to allow the publication of this case. We thank Dr Tomoko Kako, the dermatologist who performed the biopsy of the skin lesion, and Mrs Rie Hayashi of Wound Ostomy Continence who recommended the patient to our department.

Conflict of interest

The authors declare no conflict of interest.

References

- 1 Wang SQ, Mecca PS, Myskowski PL, Slovin SF. Scrotal and penile papules and plaques as the initial manifestation of a cutaneous metastasis of adenocarcinoma of the prostate: case report and review of the literature. *J. Cutan. Pathol.* 2008; **35**: 681–4.
- 2 Patel P, Patel J, Siddiqui S. Recurrence of prostate cancer with cutaneous metastasis after radical prostatectomy. *Case Rep. Urol.* 2015; **2015**: 825175.
- 3 Mak G, Chin M, Nahar N, De Souza P. Cutaneous metastasis of prostate carcinoma treated with radiotherapy: a case presentation. *BMC Res. Notes* 2014; **7**: 505.
- 4 Sueyama H. Skin cancer. In: Furutami S (ed.). *Radiation treatment planning guidelines*. KANEHARA & CO., LTD.: Japanese Society for Radiation Oncology, Tokyo, 2008; 267–71.
- 5 Thomas Brown G, Patel V, Lee C-CR. Cutaneous metastasis of prostate cancer: a case report and review of the literature with bioinformatics analysis of multiple healthcare delivery networks. *J. Cutan. Pathol.* 2014; **41**: 524–8.