



Single-fraction high-dose palliative radiotherapy for facial cutaneous squamous cell carcinoma: a case report

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Background: Cutaneous squamous cell carcinoma (cSCC) is a common malignancy affecting the skin, and its incidence increases with age; as such, it disproportionately affects the elderly. It is especially difficult to treat advanced skin cancers in elderly patients with dementia, who may not tolerate radiotherapy.

Case Description: A 100-year-old woman with advanced dementia was referred to dermatology for a large cSCC involving the nasal bridge and abutting the bilateral orbits. She was initially deemed a poor candidate for surgical resection, but over time the tumor grew and became increasingly destructive. Due to tumor growth causing symptoms and threatening vision, her family requested treatment. The patient was therefore referred to radiation oncology, and she received palliative radiation, using a single fraction of 16 gray (Gy) via a single electron field. Within 3 months, she had a clinical complete response, with no residual tumor and no persistent side effects from radiotherapy (RT). Ongoing follow-up revealed durable treatment response with no bothersome late toxicity.

Conclusions: Single-fraction palliative radiotherapy is a suitable treatment option for durable palliation in elderly patients unable to undergo surgery and unable to tolerate conventional, fractionated RT in cases of symptomatic or rapidly-progressing non-melanoma skin cancers (NMSC). It is well-tolerated in frail patients or those with dementia.

Keywords: Skin cancer; cutaneous squamous cell carcinoma (cSCC); palliative radiotherapy; radiation therapy (RT); case report

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Introduction

Cutaneous squamous cell carcinoma (cSCC) and basal cell carcinoma make up the non-melanoma skin cancers (NMSC), the most common malignancy in the United States. Sun exposure is the most important risk factor, and incidence increases with age, such that elderly patients make up the large majority of NMSC cases nationwide (1). Definitive management of NMSC varies by tumor size, location, stage, and history of previous treatment. Treatment options include topical therapy, photodynamic

therapy, cryosurgery, curettage, surgical resection alone, radiotherapy (RT) alone, or combined modality treatment with surgery followed by adjuvant RT (2). In elderly patients who are medically inoperable, RT is commonly employed as sole therapy. RT for NMSC involves fractionation, or splitting up the total dose into multiple daily treatments, in order to allow for normal tissue recovery without sacrificing tumor control. Common treatment schedules for NMSC include 60 Gy in 30 fractions, as well as 55 Gy in 20 fractions (3). However, elderly patients with

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Figure 1 Pre-treatment photograph of nasal bridge tumor.

poor performance status, difficulty with transportation, or dementia may not tolerate several weeks of daily treatment (4). In such cases, extreme hypofractionation (delivering a high dose in very few treatments) may be the most appropriate management. We present the following case in accordance with the CARE reporting checklist (available at <https://apm.amegroups.com/article/view/10.21037/apm-22-228/rc>).

Case presentation

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

A 100-year-old female nursing home resident with dementia was referred to dermatology at our hospital with a large skin cancer involving the glabella and nasal bridge. This was first worked up in mid-2018 with biopsy confirming cSCC, but the patient's family declined treatment as they wanted to focus on comfort care alone. However, over a period of 18 months, the mass increased in size from 1 to 4.5 cm, and was encroaching on the medial canthi and bilateral orbits. Although the mass was seemingly painless, the nursing facility reported she was picking at it, and the patient's family was concerned about inevitable nasal destruction and orbital invasion causing discomfort and vision loss. She met with a Mohs surgeon

at our institution in January 2021, who determined she was a poor surgical candidate given her poor performance status and the large size of the mass, as seen in *Figure 1*. The surgeon also discussed vismodegib and radiotherapy as treatment options. Following an extensive discussion between the Mohs surgeon and the family, the patient was referred to radiation oncology to determine her suitability for radiotherapy. Confirmatory biopsy in February 2021 confirmed well-differentiated cSCC.

She met with the radiation oncologist in March 2021, who determined that she would not tolerate conventional external beam radiotherapy. At that time, her ECOG Performance Status was determined to be 3. It was determined that she would not cooperate with the demands of conventional RT, such as Aquaplast mask for setup and immobilization of the head and daily treatments for at least 4 weeks, given her dementia. The physical and mental burden of daily transport for a standard course of RT was thought to be prohibitive by itself. Thus, the radiation oncologist proposed a high-dose, single-fraction RT course with clinical setup, to avoid CT simulation and a mask. Instead, she would be set up clinically on the treatment machine, using external anatomy, and planned manually using a simple en face electron field. A dose of 16 Gy was selected based on institutional experience, as the available literature lacks consensus on appropriate single-fraction doses for cutaneous SCC where durable local control is desired, rather than palliation of symptoms alone. The patient was prescribed light sedation with a low dose of oxycodone administered one hour prior to clinical setup and the treatment delivery. In March 2021, she received her single-fraction electron beam treatment, which consisted of a 6 cm circular cutout and 9 MeV electron beam with 1 cm bolus over the tumor. External eye shielding was used over both eyelids to protect the underlying cornea and lens.

Over the next several weeks, per the nursing home staff, the mass became necrotic and sloughed off. She was seen by the radiation oncologist 2 weeks after treatment, and she appeared to have a complete clinical response, with the only toxicity noted to be non-tender scabbing along the glabella and nasal bridge, as seen in *Figure 2*. Per the patient's companion, she would sometimes try to scratch at the areas of scab, but did not appear uncomfortable, and the mass was not oozing or bleeding by that time. At her follow-up visit 4 months later, the treated area had healed to near-baseline, with atrophic but intact skin, and no evidence of recurrent tumor. Her vision was unaffected and her nasal passages remained patent. Twelve months after completing

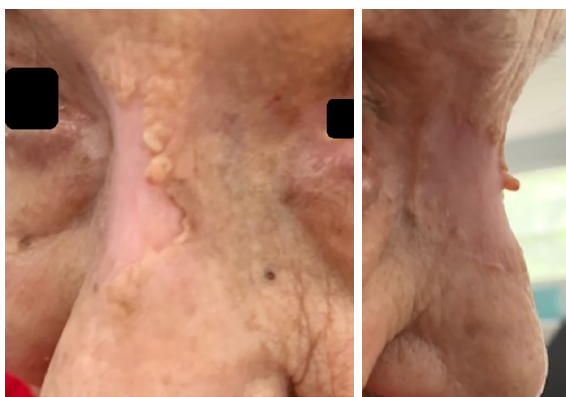


Figure 2 Post-radiotherapy photographs of nasal bridge tumor, showing complete response.

treatment, she remains free of recurrence and has no residual visual or dermatologic side effects.

Discussion

Radiotherapy is an effective treatment for NMSC, but the majority of high-level data comes from conventional fractionation (3). In patients unable to tolerate full course RT, there are no published prospective data on extreme hypofractionation. Elderly patients with dementia, transportation issues, or poor performance status may only be able to attend a single radiotherapy treatment visit. We treated such a patient with a complete clinical response and no severe acute toxicity nor any reported or observed persistent toxicity.

In the absence of high-level evidence guiding practice, our approach may be reasonable for similar situations. Sixteen Gy in a single fraction is the equivalent of 35 Gy delivered at 2 Gy per fraction, which is not a curative dose (a commonly used curative dose is 60 Gy in 30 fractions of 2 Gy; these calculations assume an alpha/beta ratio of 10 for cSCC). However, 16 Gy in a single fraction has a similar biologically effective dose to more protracted palliative courses, such as 30 Gy in 5 fractions, which is the equivalent of 40 Gy given in 2 Gy fractions (5,6). Our approach therefore comprises adequate dose that can be delivered in a single treatment. In addition, since our patient was treated with electrons, we were able to perform a clinical set up and did not require an additional visit for CT simulation for planning purposes.

We caution against broadly applying our experience to all patients with cSCC. Extreme hypofractionation

is thought to be associated with an increased risk of late side effects, such as skin fibrosis and necrosis, although a UK study showed only a 6% rate of late skin necrosis in patients who received 20–22.5 Gy in a single fraction (to smaller lesions) (7). In similar situations, where patient age and comorbidities make the risk of these late toxicities less worrisome, such an approach may be appropriate. While patient-reported toxicity is limited in a patient with dementia, adequate assessment of the eyes and skin can be performed visually, by a clinician.

The management of symptomatic and/or locally-destructive NMSC in frail, elderly patients remains a challenge. Short-course, extreme hypofractionated RT should be considered in this vulnerable population, as the only safe or tolerable alternative may be supportive care alone. We recommend future study of this patient population to determine the ideal radiotherapy dose in 1–5 fractions.

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Footnote

Reporting Checklist: The authors have completed the CARE reporting checklist. Available at <https://apm.amegroups.com/article/view/10.21037/apm-22-228/rc>

Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at <https://apm.amegroups.com/article/view/10.21037/apm-22-228/coif>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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