



# Medically inoperable Merkel cell carcinoma of the head and neck treated with stereotactic body radiation therapy: a case report

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**Abstract:** Merkel cell carcinoma (MCC) is a rare but aggressive neuroendocrine tumour of the skin. MCC is the second most common cause of death from non-melanoma skin cancer and the most aggressive cutaneous malignancy. An 88-year-old male presented with a large, bleeding skin tumour located on the right temple and pre-auricular region. A biopsy confirmed MCC; immunohistochemistry (IHC) was positive for synaptophysin and CK20. The patient was assessed by a head and neck surgical oncologist and not deemed to have operable disease due to medical co-morbidities and extent of disease. The patient underwent a single fraction of electron treatment, followed by stereotactic body radiation therapy (SBRT) to a total dose of 40 Gy in 5 fractions over 2 weeks. Bleeding stopped and the patient tolerated treatment well with no reported side effects other than fatigue. There was symptomatic improvement within 2 weeks and a complete clinical response within 4 weeks of treatment. There are limited data on the use of radiotherapy in unresected/inoperable MCC. For elderly, medically frail patients who cannot undergo surgery, SBRT may be an option to alleviate symptoms and control the tumour in a relatively short number of treatments; further study is warranted.

**Keywords:** Stereotactic body radiation therapy (SBRT); Merkel cell carcinoma (MCC); case report

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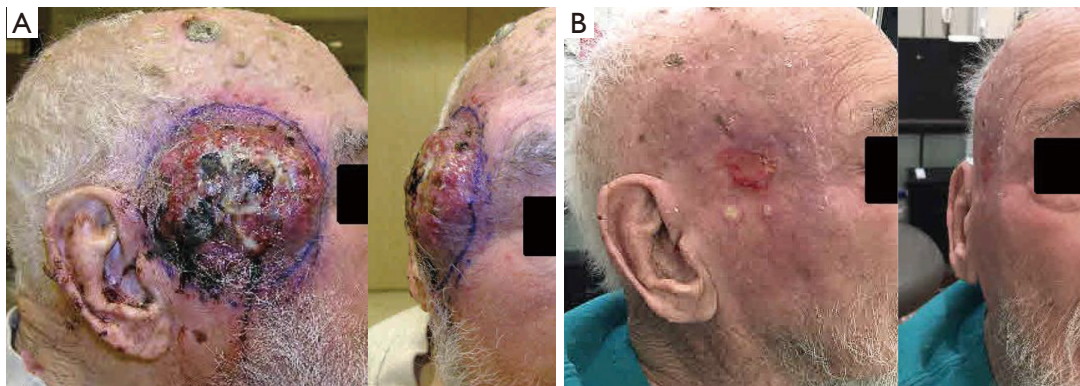
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## Introduction

Merkel cell carcinoma (MCC) is a rare neuroendocrine malignancy that usually occurs in sun-exposed areas of the skin such as the head and neck, shoulders, and upper limbs. A review of the Surveillance, Epidemiology and End Results (SEER) database reported the head and neck region to be the most common location for MCC, of which the majority involved lesions of the face (1). MCC is more likely to develop in elderly patients than in younger patients, with a mean diagnosis age of 76 years for women and 74 years for men (2). Despite having a low age-adjusted incidence rate of 0.18–0.44 cases per 100,000 persons, MCC is a rapidly progressive disease, often with an aggressive primary

tumour and a high risk of distant metastases (3). Major risk factors predisposing individuals to MCC include exposure to ultraviolet (UV) radiation, *Merkel cell polyomavirus* (MCPyV) infection and immunosuppression (4). Conventional treatment methods are currently limited by their toxicity, suitability to patient preferences, and social barriers to accessing care (5). Stereotactic body radiation therapy (SBRT) refers to the use of a small number of image-guided, high dose radiation treatments delivered to a precisely defined target tumour. This case describes the use of SBRT for a patient with locally advanced MCC and significant medical comorbidities who was not deemed to be a surgical candidate. We present the following case in



**Figure 1** Clinical findings of lesion before and after receiving treatment. (A) At presentation. Merkel cell carcinoma of the right temple. Lesion measured 8 cm across and 2 cm deep at the center. The initial electron field border is marked on the skin. (B) At follow-up. Four weeks after the completion of radiation treatment. Tumour lesion had completely resolved with a remaining 2–3 cm area of skin still healing. No nodularity, masses or palpable new nodes in the parotid and neck regions were noted.

accordance with the CARE Reporting Checklist.

### Case presentation

An 88-year-old male presented with a history of a small lesion of 6-month duration in the right temple that began to grow rapidly in the 2 months prior to diagnosis. At first consult, the tumour measured approximately 8-cm wide and 1 to 2-cm thick, involved the right temple and extended to the right side of his face (*Figure 1A*). The lesion was noted to be ulcerated and bleeding. There was no obvious lymphadenopathy of the neck, right parotid or post auricular region. A biopsy confirmed MCC based on morphology and immunohistochemistry that was positive for synaptophysin and CK20.

The patient's medical history included diagnoses of insulin dependent type 2 diabetes, congestive heart failure, emphysema, atrial fibrillation requiring bipolar ventricular pacemaker, and renal impairment (creatinine ~250  $\mu\text{mol/L}$ ). Additional comorbidities included hypertension, hypothyroidism, benign prostatic hypertrophy, seronegative rheumatoid arthritis, and mild memory impairment.

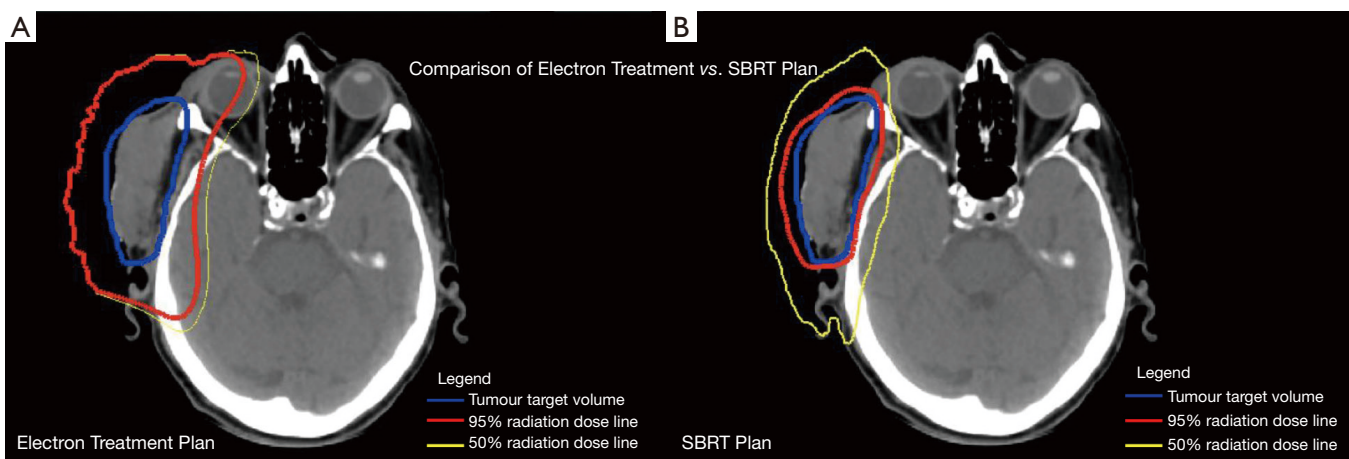
The patient was assessed in a multidisciplinary cancer clinic by a head and neck surgeon and radiation oncologist. Due to the patient's extensive medical comorbidities, advanced age and tumour extent, surgery was not recommended. Medical oncology consultation and staging scans were not ordered following discussion with the patient and his family. Radiation was recommended to decrease bleeding and achieve tumour control. In order

to start treatment urgently, on the same day as the initial consultation, the tumour was irradiated with a simple direct electron technique delivering a single 8 Gy fraction. Then, an additional 32 Gy in 4 fractions over 2 weeks were then delivered using SBRT with an immobilizing mask, computed tomography (CT) planning and volumetric modulated arc treatment (VMAT).

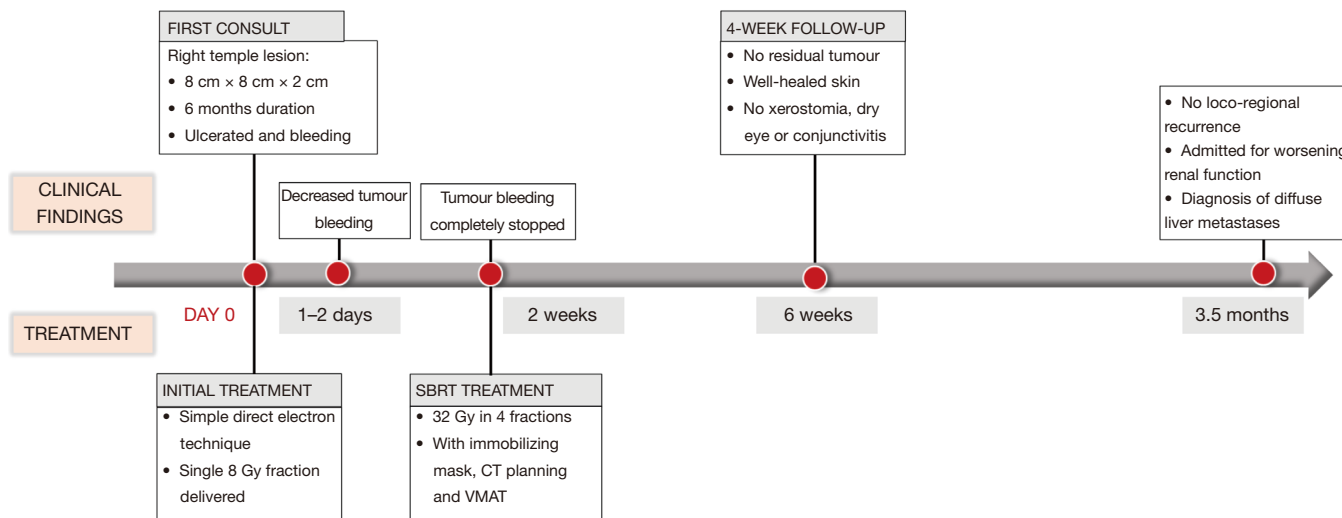
The tumour bleeding decreased within 2–3 days and stopped completely within 1–2 weeks of initiating treatment. Significant tumour shrinkage was noted after three treatments and there was no residual tumour at the 4-week follow-up visit. The skin was well-healed with a small region of erythema and residual desquamation (*Figure 1B*). The patient did not experience xerostomia, dry eye or conjunctivitis, which are potential side effects associated with conventional radiotherapy to the right side of the face. *Figure 2* illustrates the radiation dose plans for electron and SBRT treatments. Three months following the completion of treatment, there was no evidence of loco-regional recurrence, but the patient was admitted to hospital with worsening renal function, and subsequently found to have diffuse liver metastases (*Figure 3*).

### Discussion

The incidence of MCC has risen over the past two decades, with an 8% annual increase between 1986 and 2011 (6), and a current incidence of approximately 0.24 per 100,000 person-years in the United States (7). MCC is the second most common cause of death from non-melanoma skin



**Figure 2** Axial CT images showing (A) the single direct electron treatment that was used in order to start treatment immediately and urgently palliate bleeding and pain. The electron radiation dose lines do not conform closely to the target; (B) the complex SBRT treatment that was then used to give four additional high dose treatments to the tumour while avoiding critical structures, such as the right eye and brain. The radiation dose lines conform much more closely to the tumour target. CT, computed tomography; SBRT, stereotactic body radiation therapy.



**Figure 3** Timeline of the course of treatment received and associated clinical findings. CT, computed tomography; VMAT, volumetric modulated arc treatment.

cancer and the most aggressive cutaneous malignancy with a 30% mortality rate within 5 years of diagnosis (7-10).

Treatment for advanced head and neck MCC presents substantial oncological and reconstructive challenges. Wide local excision (WLE) with or without adjuvant radiotherapy following surgery is the mainstay of treatment during the initial stages of disease (11). Excision margins are dictated by the site of the tumour and typically range from 0.5 to

3.0 cm, although they are often narrower to preserve local structures (11,12). Wide surgical margins in this region can result in substantial functional and cosmetic deformities due to the proximity of important organs. Furthermore, it is difficult to predict the location of nodal metastases given the varied lymphatic drainage in this region (13). The challenges of surgical treatment are compounded by the elderly population in which MCC predominantly presents.

**Table 1** Studies of radiation therapy without surgery for MCC

Study type	N; median age (years); tumour characteristics	Regimen	Local recurrence
Retrospective (14)	n=26; median age, 68 (range, 54–96); median tumour size, 4 cm	8 Gy in 1 Fr	Local control rate: 77% (minimum follow-up, 8 months)
Retrospective (15)	n=26; median age, 72 (range, 42–100); majority stage I	50 Gy in 25 Fr	In-field control rate: 85% (median follow-up 23.5 months)
Retrospective (16)	n=43; median age, 79 (range, 48–91); median lesion size, 30 mm	51 Gy in 2 Gy Fr	Recurrence: 60%; in-field control rate: 75% (median follow-up, 39 months)
Retrospective (17)	n=57; median age, 75 (range, 36–94); median tumour size, 15 mm	52 Gy in 2 Gy Fr	Local RFS at 5 years: 90% (median follow-up, 34 months)

RFS, relapse-free survival; MCC, merkel cell carcinoma.

Radiation therapy can be a safe and non-invasive alternative for patients who do not undergo surgery. A review of the current literature suggests that fractionation schedules used to treat MCC vary, with most studies reporting 2–2.5 Gy fractions (14–17). The efficacy of larger doses has yet to be elucidated, although one study reported an in-field tumour control of approximately 80% using a single 8 Gy fraction (14). A summary of findings from retrospective studies examining the efficacy of radiation therapy for MCC is provided in *Table 1*.

SBRT is a treatment approach that typically utilizes doses of more than 5 Gy per fraction for a total of 1–5 fractions. Possible advantages include high precision in targeting the tumour and protecting surrounding tissues, and shorter treatment duration while providing similar or better cancer control compared to other techniques (14). For example, the number of treatments may be reduced from 25–30 with standard fractionation to only 4–5 treatments using a SBRT technique. This may be of particular importance for medically frail or elderly patients who have difficulty travelling to and from the cancer centre for daily visits.

The optimal treatment for patients with unresectable/medically inoperable MCC is not well defined. Although the efficacy and safety of SBRT are well established in the treatment of many other disease sites (e.g., lung, liver, bone, brain), there are no prospective data examining the effectiveness of SBRT for treating MCC. This case report illustrates the potential benefits of SBRT in the elderly population, including symptom relief, tumour shrinkage, limited side effects and fewer treatment visits. Clinical research studies are required in this patient population.

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## Footnote

*Conflicts of Interest:* All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/apm-20-258>). 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 studies involving human participants 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 any accompanying images.

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