

# Cutaneous squamous cell carcinoma of the lip successfully treated with rhenium-188 brachytherapy

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## Abstract

Cutaneous squamous cell carcinoma (SCC) is the second most common form of skin cancer. In most cases, non-invasive SCC has a good prognosis and is curable by surgical resection. Nevertheless, a small percentage of patients pose specific management problems due to the technical difficulty of maintaining function and aesthetics because of the size or location of the tumor. An emerging therapeutic approach with high-dose brachytherapy

using a nonsealed rhenium-188 resin, commercially known as Rhenium-Skin Cancer Therapy<sup>®</sup>, has been shown to be highly effective in non-invasive carcinoma, up to a thickness of 2-3 mm.

## Introduction

Cutaneous squamous cell carcinoma (SCC) is the second most common form of skin cancer, accounting for 20% of keratinocyte carcinomas. The most significant risk factors resulting in SCC include sun exposure, age, fair skin, and immunosuppression.<sup>1</sup>

According to all guidelines, surgical excision is the first-line treatment option for people with resectable primary SCC. The main limitations are represented by patients with large or multiple lesions located on the face, ear, or scalp, because of the poor functional or cosmetic outcome.<sup>2</sup> Nonsurgical treatment options include cryotherapy, laser therapy, imiquimod and 5-fluorouracil, photodynamic therapy, curettage, electrodesiccation, and radiotherapy.<sup>3</sup> Several factors, such as location, size, immune status, age, cost, and patient preference, may play a role in treatment selection. An emerging therapeutic approach with high-dose brachytherapy using the b emitter radioisotope rhenium-188 (188Re), commercially known as Rhenium-Skin Cancer Therapy<sup>®</sup> (Rhenium-SCT<sup>®</sup>), is highly effective in non-invasive carcinoma.<sup>4</sup> The therapeutic effect of 188Re b-radiation is very shallow in human tissue, up to 3 mm in depth, which makes it ideal for targeted treatment of superficial skin cancer types.

## Case Report

We report a case of a 54-year-old Caucasian woman admitted to our department with a 1-year history of dermatitis on the upper lip treated with topical steroids. She had no relevant medical history and did not take any drugs. At the clinical examination, she presented a 20 mm erythematous infiltrated plaque on the labial philtrum and upper vermilion border. Dermoscopic examination revealed a structureless white and pink background, a polymorphous vascular pattern characterized by hairpin and linear irregular vessels, and white circles around follicular openings (Figure 1). A skin biopsy was performed based on these dermatoscopic features, which suggested the diagnosis of squamous cell carcinoma. The histopathologic examination confirmed an ulcerated, moderately differentiated SCC with a thickness of 0.635 mm on sun-damaged skin. Surgery was contraindicated because of the technical difficulty of maintaining aesthetics due to the location and dimension of the tumor. We decided to treat the patient with 188Re brachytherapy considering the efficacy reported in the literature and the location of the tumor.

Brachytherapy treatment was performed at the Department of

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Key words: squamous cell carcinoma, brachytherapy, radioisotope rhenium-188.

Contributions: the authors contributed equally.

Conflict of interest: the authors declare no potential conflict of interest.

Ethics approval and consent to participate: no ethical committee approval was required by the Department for this case report.

Patient consent for publication: the patient gave her written consent to use her personal data for the publication of this case report and any accompanying images.

Funding: none.

Availability of data and materials: all data underlying the findings are fully available.

Received for publication: 8 July 2022.

Accepted for publication: 10 January 2023.

Early view: 14 June 2023.

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Dermatology Reports 2023; 15:9560

doi:10.4081/dr.2023.9560

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**Figure 1.** Patient at presentation. Erythematous infiltrated plaque on the labial philtrum and upper vermilion border. Dermoscopy shows a polymorphous vascular pattern and white circles around follicular openings.

Nuclear Medicine in Bolzano, Italy. The dermatologist, using dermoscopic examination, framed the area to be treated with a dermographic pen; an apparently healthy tissue border of 3-5 mm was also included in the irradiation field. He subsequently performed a curettage of the lesion. After this preparation, the patient went to the Department of Nuclear Medicine. The radiotherapist covered the treatment region with a removable transparent foil, on which the  $^{188}\text{Re}$  resin was applied using a dedicated applicator. Based on the depth and surface area of the lesion and the  $^{188}\text{Re}$  activity applied to the lesion, the treatment time was calculated to deliver an absorbed dose of 35 Gray to the deepest point of neoplastic infiltration (target dose). The patient presented with an invasion of 0.635 mm neoplastic thickness, a surface area of 8.9  $\text{cm}^2$  and an applied activity of 450.8 MBq, resulting in a treatment time of 58 minutes, after which the transparent foil was removed with a long-handled gripping device. After confirming the absence of contamination on her skin, the patient was discharged without any special precautions associated with the treatment, as she was not contaminated by radioactivity. Therefore, there was no risk to the patient or other people. During the radioactive resin removal



**Figure 2.** Erosions and blood crusts in the treated area after 4 weeks of treatment.



**Figure 3.** After 8 weeks of treatment.



and application process, the operators wore suitable radiation protective equipment, in particular lead glasses, a plastic face mask, and a lead apron. During the irradiation process, medical professionals were away from the treatment room. During the treatment, the patient wore plastic and lead glasses and a lead apron. In addition, to protect her gingiva, a customized shielding was realized with a thermoplastic material. After the treatment, the patient had dermatological follow-up visits at week 2, 4, 8, and 16 after treatment. After 2 weeks, the patient presented with mild erythema and edema with oozing and crusting in the treated area. After 4 weeks, she presented with erosions and blood crusts, and she referred to light pain (Figure 2). After 8 weeks, the skin was healed with an excellent cosmetic result (Figure 3). At the dermoscopic examinations, no signs of SCC were seen; only the characteristic “strawberry pattern” for actinic keratosis was observed. We decided to perform a punch biopsy 4 months after brachytherapy treatment to confirm the absence of SCC. The histopathologic examination revealed marked dermal solar elastosis, the presence of actinic keratosis, and no signs of recurrence of SCC.

## Discussion

Recently, new systemic drugs have been developed for patients with invasive SCC who are not candidates for curative surgery or curative radiation. We want to emphasize that often non-invasive SCC presents problems related to the management of the patient, especially if tumors present large dimensions, are located in critical areas, or show rapid growth. Our case report presents a case of common primary cutaneous SCC with high-risk features for recurrence, such as tumor clinical diameter ( $\geq 2$  cm) and high-risk location (nonglabrous lip). The tumor’s histological thickness and the grade of differentiation correlated with a good prognosis.<sup>5,6</sup>

In our case, surgery was not feasible because the radical resection of the tumor with healthy margins would have resulted in major aesthetic sequelae. Definitive primary radiotherapy represents an alternative to surgery and an effective curative treatment for cutaneous SCC, but it is often reserved for patients over 60 years old because of concerns about long-term sequelae if used in younger patients. Our patient was 54 years old. The main advantage of the Rhenium-SCT<sup>®</sup> technique lies in its usefulness in all types of nonmelanoma skin cancers, without restriction of anatomical location, dimension, number of lesions, clinical or histological type, and patient clinical situation. The rapid drop of the dose after 3 mm spares the underlying layers of tissue, which is of particular importance for mucous tissues like lips and genitals.<sup>7</sup> Until now, there have been few publications in the literature supporting the use of 188Re brachytherapy. Sedda *et al.* treated 53 patients with nonmelanoma skin cancers; in all treated cases, apparent complete clinical remission occurred after 3-5 months, and in 82% of the cases, this occurred after a single application.<sup>8</sup> Carrozzo *et al.* treated 15 patients with a histologically confirmed diagnosis of SCC of the penis. In this population, 12 patients healed after one or more sessions of treatment, and 2 patients did not respond.<sup>9</sup> After treatment, localized side effects have been reported, such as erythema, edema, secretion of serum, and crusts.

They start approximately after 14 days and resolve completely within 90 days, with excellent/good cosmetic results.<sup>4</sup> According to a long-term retrospective study, no indication of radiation damage was observed during the treatment and the subsequent follow-ups of 52 patients.<sup>7</sup> According to this study, all treated patients showed complete remission of the tumor after one session of treatment.<sup>7</sup> In our case, a single session was performed, with excellent clinical and aesthetic results. One treatment session is probably not sufficient to achieve complete destruction of sun-damaged cells; therefore, persisting actinic keratosis was seen in our patient. In order to detect the disease recurrence, we recommended follow-up visits every 3 months within one year after the treatment and thereafter every 6 months.

## Conclusions

Brachytherapy with radioisotope 188Re is a validated and useful treatment for superficial nonmelanoma skin cancers, especially if they are situated in high-risk locations.

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