

Eyelid Basal Cell Carcinoma with Orbital Invasion Successfully Treated with Definitive Radiotherapy: a Case Report

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Abstract:

Basal cell carcinoma of eyelid with orbital invasion are usually treated with demolitive surgery leading to severe morbidity and poor quality of life. A multidisciplinary approach is today mandatory in order to choose the best treatment or a combination of them. Radiotherapy could be a valid option in these patients, both definitive and postoperative in case of risk factors.

We describe a case report of an elderly patient with locally advanced basal cell carcinoma, that refused orbital exenteration. After imaging evaluation and treatment planning, she was treated with exclusive external beam radiotherapy (EBRT) at 54 Gy, with complete response at one year follow up, with only mild toxicity: she presented mild inferior palpebral retraction and mild keratoconjunctivitis sicca, not affecting daily quality of life. EBRT could be always considered in the multidisciplinary approach to eyelid and orbital tumors, to better personalize multimodality treatment.

Key words: basal cell carcinoma; orbital invasion; radiotherapy; quality of life

Introduction

Basal cell carcinoma (BCC) is the most common skin cancer. Most of them occur in head and neck region, also in the periocular area [1]. Skin BCC usually affected elderly people, mainly those with prolonged exposure to ultraviolet radiation [2].

Tumors located in the medial or lateral canthus have a greater propensity to recurrence and orbital invasion, because of the proximity of the skin to the periosteum. [3,4].

Until the last years, orbital invasion has been treated with surgical exenteration as the only therapeutic option [3], which can lead to severe morbidity and poor quality of life.

However, this therapeutic arm continues to be a useful treatment option, but today we have new therapeutic options that could avoid globe

removal, preserving quality of life and vision, maintaining good oncological outcomes.

Radiotherapy (RT) could be a valid alternative to local treatment, even if the risk of ocular toxicity has to be carefully evaluated [2].

Systemic therapies such as vismodegib and sonidegib are indicated to treat locally advanced BCC that have recurred after surgery or that are not candidates for surgery or radiotherapy [5].

Focusing on RT, it could be indicated in a definitive setting as the only treatment or in the adjuvant setting after surgery. In patients not candidate for surgery, RT led to an important local control with recurrence rates of 25% [6].

The most frequent adverse events after RT could be xerophthalmia, cataract formation, neovascular glaucoma, retinopathy, optic neuritis or

blindness in the worst cases [7]. *Leibovitch* et al. showed complications in up to 25% of cases, mainly in the periorbital region and in the eyeball [3]. Moreover, in case of adjuvant treatment, RT can threaten the recovery of the anophthalmic cavity after exenteration.

In this paper we describe the exclusive radiation treatment of a patient affected by a BCC with orbital invasion, obtaining good oncological outcome without severe toxicity.

Case presentation

The treated patient was a 71-year-old woman. She came to our observation in May 2023, with an ulcerated eyelid lesion that was neglected for 2 years, with limitations of ocular motility. After surgical and oculist evaluations, the biopsy resulted as an infiltrating BCC (**Figure.1**)



Figure 1: Eyelid tumor before RT

The imaging (computed tomography (CT) and magnetic resonance imaging (MRI) reported a solid tissue originating from the inferior right eyelid with extension to internal canthus, to fat tissue and with infiltration

of inferior rectal muscle, without a cleavage plan with ocular globe (**Figure.2a and Figure.2b**).

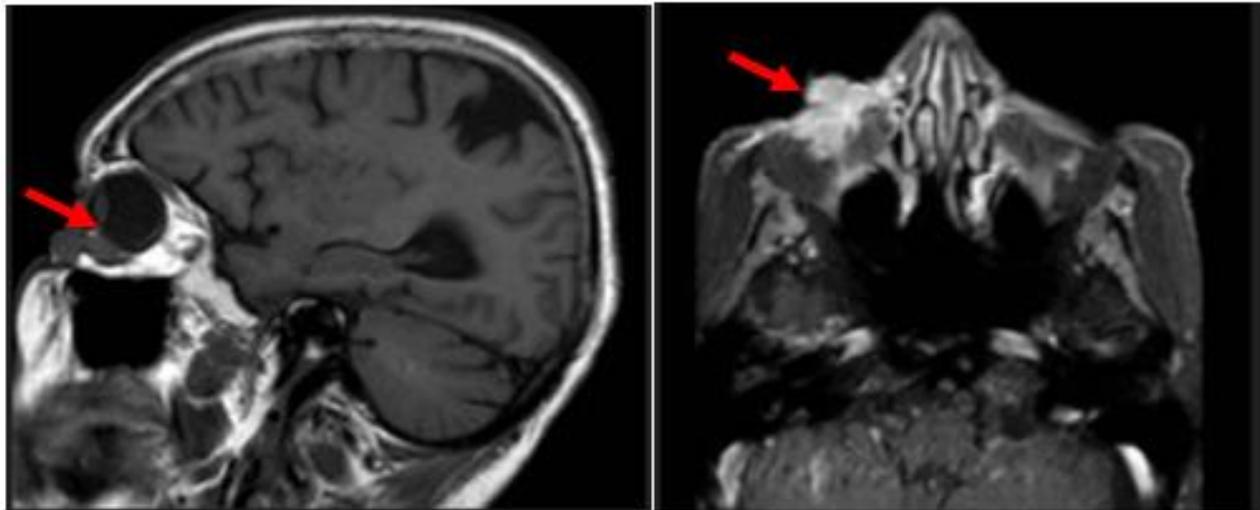


Figure 2a and 2b: Diagnostic MRI (sagittal view and axial view)

The patient was firstly evaluated by surgeons that proposed exenteration orbitae, but she refused it. After that, she made a visit in our radiation oncology department: after explaining modality and possible toxicity of a RT, the patient accepted and signed the informed consent.

Therefore, we planned a simulation CT with a personalized thermoplastic mask at 2 mm slices. To better identify the target, we merged the images of CT-simulation and diagnostic MRI.

A Gross Target Volume (GTV) was delineated, then it was expanded 2 mm to Clinical Target Volume (CTV) and other 3 mm to Planning Target Volume (PTV). The prescribed dose was 54 Gy delivered in 27 fractions, at conventional fractionation [8] The locoregional Organs at Risk (OARs) were identified.

The treatment planning was performed with Philips Pinnacle³ Evolution V16.4.3 treatment planning system (TPS), with double arcs Volumetric Arc Technique (VMAT) and 6 MV photons (**Figure.3**).



Figure 3: Treatment plan

The treatment was delivered in June-July 2023. Each RT fraction was preceded by daily positioning control with Image Guided Radiotherapy (IGRT), performed by a Cone Beam Computer Tomography (CBCT) checked by a physician. Once a week the patient was evaluated by a nurse and physician to detect any symptom or sign of acute toxicity.

During RT the patient developed skin erythema (CTCAE v5.0: grade 2) [9] in the irradiated area, with a small part of epitheliolysis in the inferior eyelid treated with topic solutions, and mild xerophthalmia successfully treated with eye drops.

At the first follow up visit in November 2023, the patient was in good general condition, the acute toxicity was solved, and she did not show any late toxicity except for slight blurred vision on the treated side. Moreover, the tumor appeared in partial response.

Subsequently, in January 2024, the control MRI described a complete response from the BCC. The patient showed only bilateral cataract and a mild xerophthalmia, treated with artificial tears.

At one year follow-up the MRI reported a complete response (**Figure.4**)



Figure 4: MRI at one year after RT

and the patient was in good condition, with mild inferior palpebral retraction and mild keratoconjunctivitis sicca (**Figure.5**).



Figure 5: Patient clinical outcome at one year follow-up

Discussion

We presented a case of a BCC of eyelid infiltrating orbital muscles and fat tissue, successfully treated with RT, preserving the eye globe and patient vision.

RT in orbital tumors is an effective treatment in addition to surgery or other local therapies. The selection of the best treatment for a patient has to be discussed in a multidisciplinary team, considering oncological outcome, cosmesis and quality of life.

Usually, the treatment of eyelid tumors with orbital invasion is orbital exenteration that frequently causes functional and cosmetic impairment, affecting patient quality of life [4].

Our patient, after refusing surgery and informed about possible RT complications, achieved a complete response at one year after treatment with good quality of life, mild and tolerable toxicity. She leads a normal life and vision was preserved, with patient satisfaction.

In literature, there is few evidence about these advanced tumors treated with exclusive RT. *Kramkimal et al.* described eight patients with BCC, with one of them involving the right eye, treated with RT at a total dose of 66 Gy [10]: complete clinical remission was observed after eight months with a residual teary eye. Moreover, *Pontoniero et al.* reported an innovative RT treatment for periorbital tumors, because they approached the lesion with stereotactic body RT, delivering 40 Gy in 10 sessions, prescribed to the 70% isodose line, obtaining a clinical long-term remission of disease with mild toxicity [11].

In some cases, and in centers with high expertise, brachytherapy (BRT), a specific RT technique, could also be proposed for eyelid tumors. Interstitial BRT consists of an implant of plastic catheters in which a radioactive source passes through, in order to give high doses to the tumor area with a good local control, reducing toxicity to near structures [12].

The reported treatment of an invasive cutaneous BCC is limited by its monocentric nature and as a one-patient experience, but it could permit to more and more consider and propose RT as a definitive chance in these scenarios.

Conclusions

In conclusion, RT is an effective option for eyelid BCC tumors also at advanced stage, above all if surgery is contraindicated or refused. The

importance of the radiation oncologist in the multidisciplinary discussion is mandatory. Lastly, to focus more and more on organ preservation and on prolonged oncological outcomes, today and in the future, we will be able to increasingly evaluate the combination of local therapies, such as surgery and RT, with the new immunotherapeutic drugs, as Cemiplimab and Pembrolizumab [13].

Conflicts of interest: Not declared

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