VOLUME - 12, ISSUE - 11, NOVEMBER - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Radiotherapy

# BRACHYTHERAPY AS A TREATMENT ALTERNATIVE FOR RECURRENT CONJUNCTIVAL SQUAMOUS CELL CARCINOMA: A CASE REPORT

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**ABSTRACT** **Background:** Squamous cell carcinoma is a common malignancy of the ocular surface. Surgical excision of the lesion is the most common intervention used to treat Squamous cell carcinoma of the conjunctiva. Radiotherapy could provide an alternative for the treatment of Squamous cell carcinoma of the conjunctiva, resulting in improved cosmetics and functional outcomes. **Objective:** This case study reports on, with informed consent from the patient, the use of brachytherapy for recurrent SCC of the conjunctiva. **Results and Conclusion:** Follow-up in this case study – evident by disease control at 3 months post-treatment – provides a unique case to suggest brachytherapy implant as a viable option for the treatment of suitable cases of recurrent conjunctival squamous cell carcinoma

**KEYWORDS :**

## INTRODUCTION

Squamous cell carcinoma is a common malignancy of the ocular surface, with an incidence varies, from 0.025 to 3.5 per 100,000 people, depending on the geographic location[1]. The mean age of diseased patients is nearly 70 years. The risk factors of conjunctival Squamous cell carcinoma is multifactorial, such like age, fair pigmentation, Ultraviolet light exposure and exposure to human papillomavirus (HPV). Ultraviolet radiation is considered to be the most important cancerogenic factor in the past, HPV infection and impairment of p53 function have been identified as frequent events in conjunctival Squamous cell carcinoma. Recent studies, however, indicate that the role of HPV in the pathogenesis may be auxiliary. The p53 protein probably is involved in the development because of its frequent presence in both benign and malignant neoplasms of the eyelids. A Squamous cell carcinoma of the conjunctiva is a slight threatening as it can invade the anterior chamber of the eye and orbital septum or form distant metastasis. [2]

Surgical excision of the lesion is the most common intervention used to treat Squamous cell carcinoma of the conjunctiva. The recurrence rates after surgical excision are 30-40% [3]. These high rate of recurrence make it necessary to perform strict follow-up of patients who receive treatment for Squamous cell carcinoma of the conjunctiva. For patients who are diagnosed with recurrent Squamous cell carcinoma of the conjunctiva there is limited clinical evidence to support one treatment alternative over another. The lack of evidence is an issue as recurrent Squamous cell carcinoma of conjunctiva grows aggressively and invades local structures more rapidly, increasing the need for definitive treatment. In these cases, when local control is unsuccessful, the eye is removed surgically via a technique called enucleation. This will reduce patients quality of life and significantly impact their visual function. Therefore, the development of a more cosmetically acceptable and effective treatment for recurrent Squamous cell carcinoma of the conjunctiva would be of benefit to patients diagnosed with this condition.

Radiation treatment with brachytherapy may be considered in advanced or recurrent cases with or without globe invasion . This treatment option aims to spare the ocular function of the eye and preserve cosmesis.[4] This case study reports on, with informed consent from the patient, the use of brachytherapy for recurrent SCC of the conjunctiva.

### Case Report

A 45 years old female presented with recurrent Squamous cell carcinoma of the right nasal conjunctiva. The patient's previous history which includes medical and surgical gave the knowledge of previous multiple interventions. Initially, patient complained of painful mass over right conjunctiva 2 years back and it was surgically removed with local excision. The lesion recurred 6 months post-excision and was subsequently managed again surgically with a wide local excision. Patient then received 3 cycles of chemotherapy with paclitaxel and carboplatin. Patient was also treated with brachytherapy implant to a dose of 21 Gray (Gy) in 7 fractions.

After 1 year a recurrent lesion was detected on the surface of nasal conjunctiva. the patient declined enucleation following this SCC recurrence. Subsequently, multidisciplinary consultation offered treatment with brachytherapy by strontium-90, beta-applicator to a dose of 32 Gy in 8 fractions on continuous eight days with one day gap of Sunday after 3rd fraction. The maximum energy of beta rays emitted is 2.3 MeV which is not having much penetration hence no damage to depth part of the eye. The calculated treatment time was 10.57 minutes.

The risk of ulceration, scleral perforation, ischemia and nasolacrimal duct obstruction was explained to the patient. This risk was further increased in this case because of re-irradiation of the previously treated area, and a particularly sensitive region post brachytherapy and surgery. Topical anesthesia with proparacaine eyedrops (Paracain Sunways (India) Private Limited, Mumbai) was administered to the right eye prior to retractor positioning, to ensure eyelids remained open throughout implant placement.

After positioning of the retractors the patient was instructed to maintain gaze on a target positioned to the left side of the room, and the eye was monitored throughout treatment delivery. Prior to the treatment Lubricating eyedrops (carboxymethylcellulose Sodium) were prescribed for administration to prevent drying of the ocular surface, and for the patients self-use between fractions to relieve dry eye symptoms.

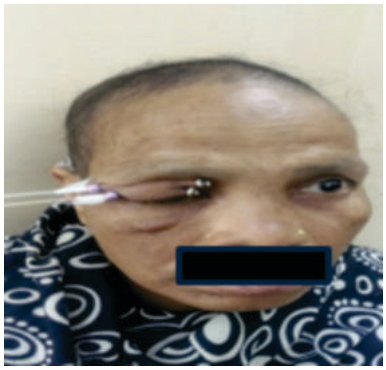

**Figure 1: figure shows brachytherapy implant**

**Figure 2: shows beta applicator**

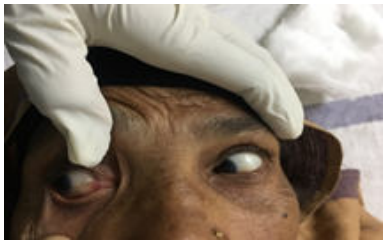

**Figure 3: figure shows the patient before the treatment with beta applicator**

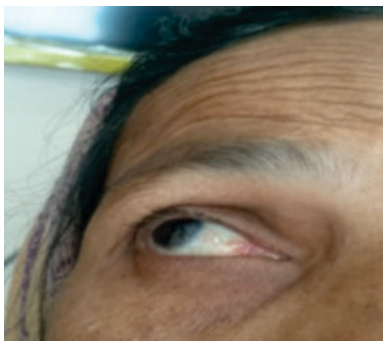

**Figure 4: shows the patient after treatment with beta applicator during follow up visits**

**Results and follow-up**

During the course of treatment patient did not reported any complain. At one month follow-up, the patient reported mild irritation and symptoms of dry eye. There was no palpable lymph nodes within the neck. The parotid and submandibular glands were also clear of any recurrence. A magnetic resonance imaging (MRI) scan, confirmed the absence of recurrent disease.

## DISCUSSION

Radiotherapy could provide an alternative for the treatment of Squamous cell carcinoma of the conjunctiva, resulting in improved cosmetics and functional outcomes. The advantage of radiotherapy is that it provides a localized treatment of the targeted area that aims for tumor control with additional avoidance of adjacent healthy tissue. When treating ocular neoplasia, radiotherapy enables ocular function preservation and improved cosmesis compared to the surgical removal of the eye by enucleation. Melia *et al*[5] showed enucleation has a greater impact on activities of daily living which reduces quality of life. This demonstrates the potential for using radiotherapy to treat recurrent Squamous cell carcinoma of the conjunctiva by providing tumor control and preserving visual function with minimal side effects. This case provides evidence that brachytherapy may be a suitable treatment option for recurrent Squamous cell carcinoma of the conjunctiva.

Whilst electron beam radiotherapy is an option when treating Squamous cell carcinoma of the conjunctiva, it is suboptimal compared to brachytherapy implant. The surface sparing properties of electron beams can result in inadequate surface dose being delivered to the superficial target volume in Squamous cell carcinoma of the conjunctiva. In comparison, brachytherapy implant can be applied directly to the conjunctival surface, providing maximum surface dose, and limits the depth of penetration of harmful radiation.

Additionally, in this case, treatment with electron beam radiation was not feasible as the field size required to cover the target volume was less than the minimum field size able to be achieved with electron beam therapy. By using brachytherapy implant, the issue of field size with electron beam radiotherapy can be overcome, as the area irradiated can be confined to the small lesion size and spare adjacent healthy tissue. Thus, brachytherapy implant in comparison to electron beam treatment would provide better treatment coverage of the tumor volume and more adequately spare healthy tissue to preserve ocular function when treating recurrent Squamous cell carcinoma of the conjunctiva.

Brachytherapy implant can also be used as a salvage treatment alternative, avoiding the invasive alternative of orbital enucleation. Brachytherapy, in comparison to other radiotherapy techniques, offers more appropriate coverage of the tumor volume. However, it must be emphasized that effective treatment must consider limitations of size and location of the treatment area associated with implant. The field size for brachytherapy must provide coverage of the lesion with an acceptable margin to allow for random and systematic deviations in treatment delivery and microscopic disease in the periphery of the lesion.

In comparison to other treatment options, brachytherapy does not require general anesthesia or overnight hospital admission. Conversely, brachytherapy does place a significant time burden on the patient with a requirement to attend twenty-two consecutive treatment appointments (5/week) in external beam radiotherapy. The procedure is not surgically invasive though the frequent attendance requirements may act as a deterrent for many considering brachytherapy. There are arguably departmental and therapeutic advantages to treating Squamous cell carcinoma of the conjunctiva with brachytherapy, though technical considerations need to be identified.

Brachytherapy may be the preferred treatment option in cases of Squamous cell carcinoma of the conjunctiva if it can be proven to successfully manage the condition. As previously discussed, there is no evidence to support one treatment over the other for recurrent Squamous cell carcinoma of the conjunctiva. As the ocular function of the right eye was maintained and visual acuity unaffected, this may have a positive effect on patient quality of life in comparison to other treatments for recurrent of Squamous cell carcinoma the conjunctiva, and although no measurement of quality of life was performed in this study, it would be of benefit in future investigations. Dry eye was the only reported side effect from treatment and is a common long-term ocular side effect from brachytherapy . In this case, the patient was prescribed ocular lubricants to manage symptoms of dryness and monitored at follow-up appointments. Dry eye was subjective and not graded pre or post-treatment using subjective or objective grading scales. This was a limitation in this case study that may be included in further studies investigating brachytherapy implant for Squamous cell carcinoma of the conjunctiva.

## CONCLUSION

Follow-up in this case study – evident by disease control at 3 months post-treatment – provides a unique case to suggest brachytherapy implant as a viable option for the treatment of suitable cases of recurrent conjunctival squamous cell carcinoma Furthermore, in this instance, vision was not compromised whilst delivering an excellent cosmetic outcome. Currently, there is a distinct lack of evidence

supporting the use of brachytherapy for Squamous cell carcinoma of the conjunctiva. This case study provides a snap shot of the role brachytherapy may be able to play as an effective treatment option for recurrent Squamous cell carcinoma of the nasal conjunctiva. Further studies, in a larger patient cohort, are needed to further interrogate the role of brachytherapy as an alternative and less invasive treatment for squamous cell carcinoma of the conjunctiva.

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