

Ruthenium brachytherapy for intraocular growth of a conjunctival squamous cell carcinoma: a case report

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Abstract

The aim of this study is to report the use of ruthenium brachytherapy as an adjunctive treatment in the management of an intraocular extension of the conjunctival squamous cell carcinoma (SCC).

In 2013, a 73-year-old man presented with a tumor blocking the angle and infiltrating corneal endothelium. The patient was treated with iridectomy, and after one month, ruthenium brachytherapy was applied. 4.5 years post-irradiation, the treated eye is painless, and no recurrence was noted.

We advocate the use of ruthenium brachytherapy as an eye salvage treatment with an intraocular extension of conjunctival SCC.

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Key words: conjunctiva, eye, ruthenium, squamous cell carcinoma, tumor.

Purpose

Conjunctival squamous cell carcinoma (SCC) has an overall population prevalence of 0.13-0.9% per 100,000 [1]. It tends to be more frequent among men and in the elderly population, and 75% of these lesions appear close to the limbus [2]. Intraocular extension of conjunctival SCC is extremely rare, occurring in about 2-11% of cases [2]. It may appear in artificial entry site following too deep keratectomy or a surgical wound. We present a patient with the intraocular extension of conjunctival SCC, whose eye was salvaged with iridectomy and adjunctive ruthenium plaque insertion.

Case description

In 2013, a 73-year-old man presented to our clinic with ocular irritation, pain, and visible tumor mass in the anterior chamber of his left eye. He gave a past ophthalmic history of same eye pterygium surgery a year earlier that was performed elsewhere and an unsuccessful postoperative steroid treatment due to presumed anterior uveitis. On examination, the vision was 20/35 in the affected eye, and 20/20 in the fellow eye, which was healthy. The intraocular pressure was normal in both eyes. A white solid mass was seen in the left anterior cham-

ber covering the nasal part of the iris, and infiltrating the corneal endothelium (Figures 1A-B). On gonioscopy, the tumor was blocking 2 clock hours of the angle. Both fundi were unremarkable, and the submandibular and periauricular lymph nodes were normal. Iridectomy was performed as the first line treatment to remove a part of the tumor adjacent to the iris and for histopathological diagnosis. However, the residual tumor tissue was still present in the anterior chamber and deeper layers of the cornea. The histopathological report revealed T3N0M0 invasive squamous cell carcinoma originating from the conjunctiva with the signs of HPV infection (koilocytosis) (Figures 1C-D). The margins of resected tissue were infiltrated with tumor cells. A month later, conjunctival mapping biopsy was undertaken, which demonstrated no conjunctival involvement, and adjunctive ruthenium plaque brachytherapy was performed to eradicate the residual tumor tissue (Figures 2A-B). The conjunctiva was cut approximately 7 mm from the limbus, and the medial rectus was disinserted to create the opening for the 20 mm CCB plaque as well as to irradiate a wider part of the conjunctiva adjacent to the limbus. The plaque was placed in the nasal part of the conjunctiva covering approximately 6 clock hours of the corneoscleral junction to ensure coverage of all remaining tumor. A dose of 86 Gy at a depth of 1.2 mm was delivered over 24 hours.

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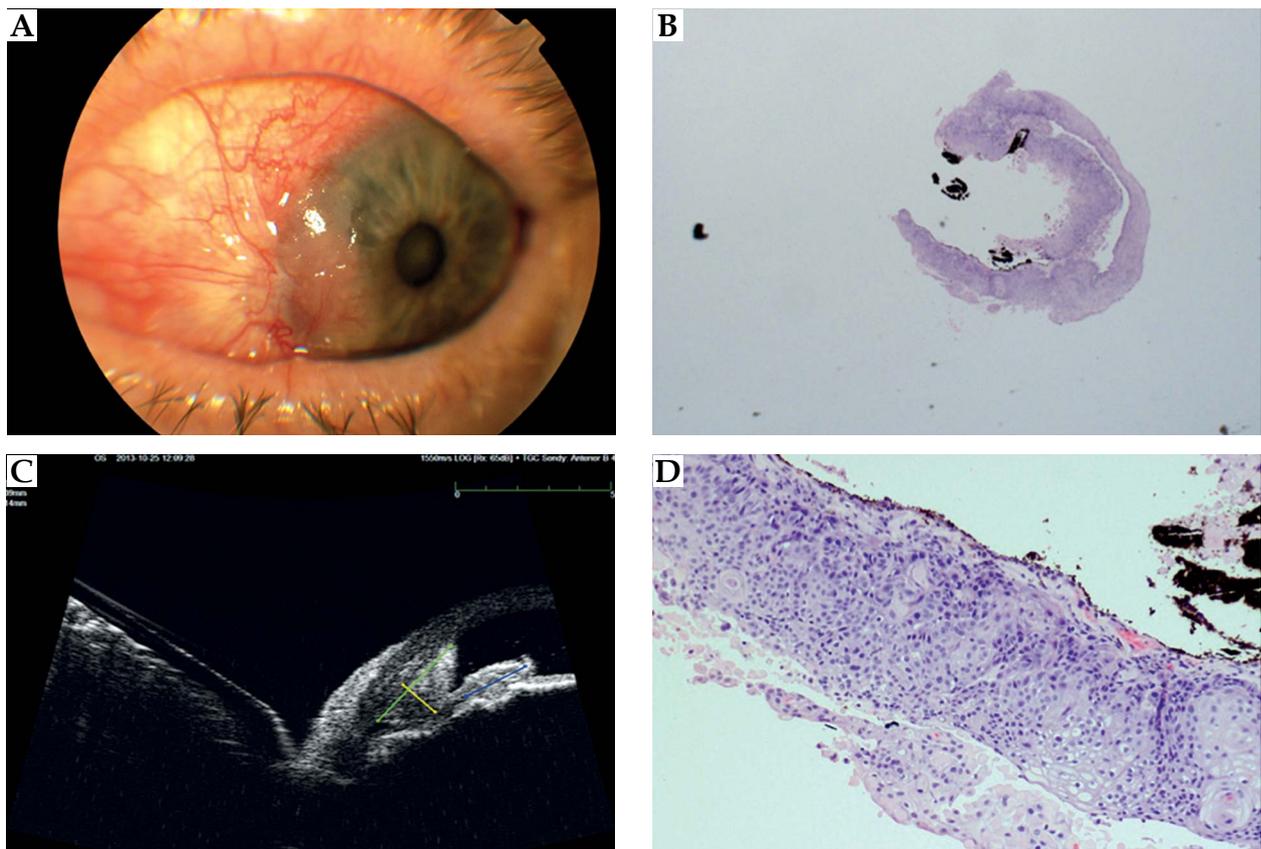


Fig. 1. The left eye of the patient at presentation: **A)** anterior segment photo showing intracameral infiltration of the conjunctival tumor with a visible scar and an entry site following pterygium surgery; **B)** ultrasound biomicroscopy demonstrating angle involvement and corneal infiltration; **C)** pathology specimen following iridectomy, overview; **D)** H+E stain

At 4.5 years post-treatment, the affected eye is painless with the vision of 1.0. The intraocular part of the tumor had completely regressed; no orbital or conjunctival recurrence was noted. There was, however, a sectorial cortical cataract (Figures 2C-D) that was removed during uneventful phacoemulsification surgery 6 months ago. No distant metastases were observed at the last follow-up visit.

Discussion

This is a first report on the use of ruthenium brachytherapy in the management of corneal endothelium involvement caused by conjunctival SCC. The globe was salvaged, and no recurrence was noted at 4.5 years follow-up. There are approximately 20 cases of intraocular extension of squamous cell carcinoma described in the literature, the majority of whom were treated with enucleation [1,2,3,4,5,6,7]. More recently, Arepalli *et al.* demonstrated a good tumor control of a recurrent SCC infiltrating the sclera with iodine plaque brachytherapy [8]. Out of the reported 15 cases with a scleral invasion, three patients had an intraocular extension. Enucleation was performed in one of 3 patients with recurrence, 5 months post-radiotherapy, and in a second case due to ocular irritation. None of the reported patients developed

metastasis [8]. The successful treatment in such cases is uncommon. Reported patients are listed in Table 1.

A majority of cases described were preceded by pterygium surgery. Too deep keratectomy might have created an entrance for a tumor invasion, and this was clearly visible on the preoperative photograph of our patient. According to the literature, the intraocular invasion is often confused with granulomatous anterior uveitis, as this was also observed in the case reported. However, the diagnosis is facilitated by histopathological examination. Conjunctival SCC and pterygium may have a similar clinical presentation, but present different treatment requirements, therefore, differentiation is crucial. Some authors recently investigated the scope of the pathology screening of every excised pterygium [9] as well as the prevalence of invasive carcinomas in pterygium specimens [10], but found no justification for detailed pathology report in every case.

In Europe, ruthenium brachytherapy is widely used to treat small choroidal tumors up to 6 mm in thickness. It has been previously employed for anterior segment irradiation in recurrent conjunctival SCC with no intraocular involvement [11], and as an adjunctive to surgical resection for irradiating tumor bed in invasive conjunctival tumors [12]. Long-term follow-up suggests that the risk of corneal melting is minimal. The doses reported suggest 100 Gy to the tumor apex at 2 mm [11] or 1 mm [12] in depth.

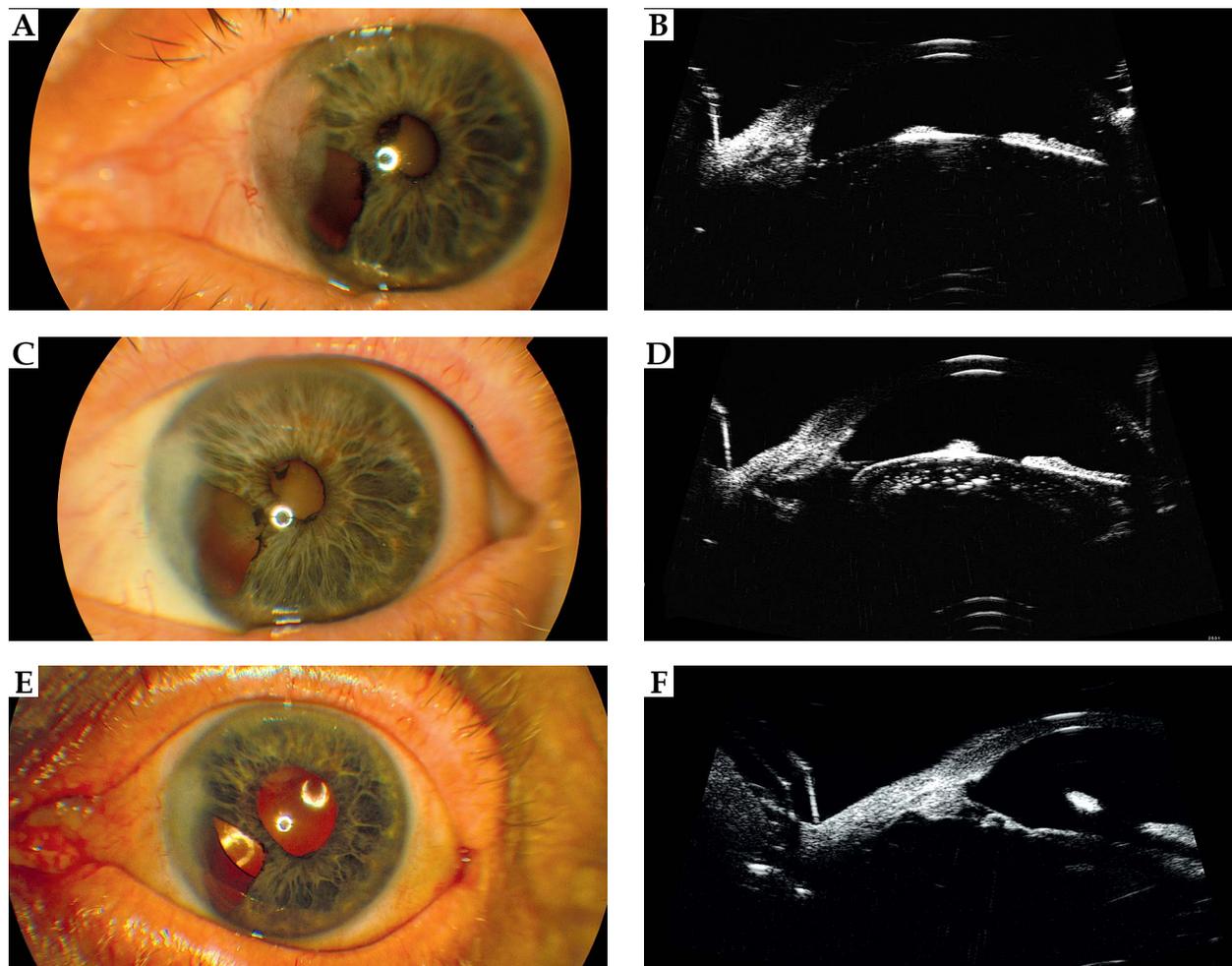


Fig. 2. The eye after treatment: **A, B)** before adjunctive brachytherapy, corneal endothelial infiltration still visible; **C, D)** four years post-irradiation, BCVA - 0.4, no recurrence noted. The cataract formation at the site of the iridectomy can be visible on UBM; **E, F)** four years post-irradiation, post-cataract surgery, BCVA - 1.0

Table 1. The reports of eye saving treatment in cases of intraocular extension of conjunctival squamous cell carcinoma

Authors	Treatment	Plaque type	Prescription dose	Number of patients	DFS	Treatment outcome
Char <i>et al.</i> [5]	Iridocyclectomy	–	–	1		No major complications at 3.5 years post-surgery
Arepalli <i>et al.</i> [8]	Irradiation	¹²⁵ I	50-80 Gy	3 out of 15 reported	1-8 months (mean 5), n = 4	Secondary enucleation, n = 2
Häberle <i>et al.</i> [11]	Irradiation	¹⁰⁶ Ru	100 Gy	2	24 months	No major complication seen

DFS – disease-free survival

Conclusions

Intraocular extension of conjunctival SCC is rare, and if the corneal endothelium and anterior chamber are infiltrated, it may be managed with ruthenium plaque brachytherapy.

Disclosure

The authors report no conflict of interest.

References

1. Rootman DB, McGowan HD, Yücel YH et al. Intraocular extension of conjunctival invasive squamous cell carcinoma after pterygium surgery and cataract extraction. *Eye Contact Lens* 2012; 38: 133-136.
2. Shields JA, Shields CL, Gunduz K et al. The 1998 Pan American Lecture. Intraocular invasion of conjunctival squamous cell carcinoma in five patients. *Ophthal Plast Reconstr Surg* 1999; 15: 153-160.

3. Char DH, Kundert G, Bove R et al. 20 MHz high frequency ultrasound assessment of scleral and intraocular conjunctival squamous cell carcinoma. *Br J Ophthalmol* 2002; 86: 632-635.
4. Zhang Z, Li B, Shi J et al. Intraocular extension of conjunctival squamous cell carcinoma. *Ophthalmologica* 2007; 221: 200-203.
5. Char D, Crawford JB, Howes EL et al. Resection of intraocular squamous cell carcinoma. *Br J Ophthalmol* 1992; 76: 123-125.
6. Leal I, Sousa D, Loureiro C et al. Sympathetic ophthalmia related to conjunctival invasive squamous-cell carcinoma. *Indian J Ophthalmol* 2017; 65: 741-743.
7. Kaliki S, Kamal S, Fatima S. Ocular surface squamous neoplasia as the initial presenting sign of human immunodeficiency virus infection in 60 Asian Indian patients. *Int Ophthalmol* 2017; 37: 1221-1228.
8. Arepalli S, Kaliki S, Shields CL et al. Plaque radiotherapy in the management of scleral-invasive conjunctival squamous cell carcinoma. An analysis of 15 eyes. *JAMA Ophthalmol* 2014; 132: 691-696.
9. Hirst LW, Axelsen RA, Schwab I. Pterygium and Associated Ocular Surface Squamous Neoplasia. *Arch Ophthalmol* 2009; 127: 31-32.
10. Segev F, Mimouni M, Tessler G et al. A 10-year survey: prevalence of ocular surface squamous neoplasia in clinically benign pterygium specimens. *Curr Eye Res* 2015; 40: 1284-1287.
11. Häberle H, Pham DT, Scholman HJ et al. Ruthenium 106-applicator for radiation treatment of carcinoma in situ of the cornea and conjunctiva. *Ophthalmologe* 1995; 92: 866-869.
12. Kenawy N, Garrick A, Heimann H et al. Conjunctival squamous cell neoplasia: the Liverpool Ocular Oncology Centre experience. *Graefes Arch Clin Exp Ophthalmol* 2015; 253: 143-150.