

# Radiotherapy for nasopharyngeal carcinoma: Effect on the eye 10 years later: A case report

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**Abstract.** A patient who had previously received radiotherapy for a nasopharyngeal carcinoma was rightfully discharged from otorhinolaryngology and oncology once treatment was completed. After 10 years, the patient presented with visual loss in one eye and was found to have radiation retinopathy. This case highlights the importance of recognising the effects that radiation administered to structures near the eye can have on vision. The latency of this case demonstrates the need for routine eye tests in patients who have undergone radiotherapy near the orbit. Prompt recognition and referral to ophthalmologists is necessary for all suspected cases to best manage visual loss.

## Introduction

Radiation retinopathy is a known visual complication of radiotherapy administered to orbital or periorbital structures, with an incidence of proliferative retinopathy reported at 6% at 5 years in a large study of 3,841 eyes treated with plaque radiotherapy for ocular melanoma (1). Irradiation of nasopharyngeal carcinomas involve treatment over a large field with high dosage (2). Though nasopharyngeal carcinomas are relatively radiosensitive (2), a significant proportion of patients have a long life-expectancy, and therefore late visual complications can occur and are a concern to patients, ENT specialists, ophthalmologists and radiation oncologists. We describe a succinct case of a patient that developed radiation retinopathy following treatment for nasopharyngeal carcinoma.

## Case report

A 37-year-old male was referred to the ophthalmology department by his optometrist, with a one-month history of blurred vision in the left eye. Ten years previously, he had received radical radiotherapy for a nasopharyngeal carcinoma staged T1N1M0. There was no recurrence and no other medical history of note.

On presentation, his visual acuities were 6/6 right eye and 6/36 left eye. The eyes on inspection appeared healthy and the right eye's retinal examination was unremarkable, however the left retina demonstrated fine intraretinal haemorrhages, cotton wool spots and hard exudates (Fig. 1).

An optical coherent tomography scan of the left retina showed macular oedema. Blood pressure and blood tests including glucose and HbA1c were all normal. A diagnosis of radiation retinopathy was made and the patient received four doses of intravitreal Ranibizumab at one-month intervals, even though evidence for this intervention is limited. The visual acuity of the left eye improved to 6/18 by the time of the third injection and has remained at this level for a follow-up period of three years.

## Discussion

Radiation retinopathy occurs after exposure to radiation (external beam, plaque brachytherapy or stereotactic radiosurgery) administered around the orbital region (3). This occurs in 7% of cases that receive radiation to the globe, orbit, sinuses or nasopharynx (1). Retinopathy usually occurs after 6 months to 3 years after treatment, which is thought to be the turnover time for endothelial cells of the retinal vasculature (4), although cases have been reported after 15 years of exposure (1). Radiation retinopathy is often dose, daily fraction size and fraction interval dependent, with the usual threshold dose for retinal damage at 30-35 Gy (1). Higher total radiation dose and fewer fractions was associated with increased risk of developing retinopathy (5,6).

Clinical features include retinal microvascular changes including endothelial cell loss, capillary occlusion, telangiectasia and microaneurysms. Other retinal findings are oedema, exudates, cotton wool spots, haemorrhages, papillopathy (inflammation of the head of the optic nerve), radiation-induced

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Figure 1. Colour fundus photo of the right eye (top) and left eye (bottom) showing fine intraretinal haemorrhages, cotton wool spots and hard exudates.

optic neuropathy and proliferative retinopathy. Affected patients may also develop other ophthalmic features including cataract and keratopathy (3).

Differential diagnoses to consider are diabetic retinopathy, retinal vein occlusion, ocular ischaemic syndrome and hypertensive retinopathy. Radiation retinopathy is mainly distinguished from its differentials due to a) a history of identified exposure to ionising radiation b) clinical examination shows irregular dilation of the capillary bed at the posterior pole of the fundus, rather than significant venous or arterial irregularities which may signify vein occlusion or hypertensive retinopathy c) presence of macular oedema, which would occur with radiation or diabetic retinopathy, but not in uncomplicated hypertensive retinopathy d) normal blood pressure and diabetic blood tests. In summary, a vascular work up, a history of exposure together with retinal findings would need to be considered when considering the differential diagnoses.

Treatment aim is to reduce retinal oedema and prevent new vessel formation. Treatment options include the use of laser photocoagulation, intravitreal corticosteroids and anti-vascular endothelial growth factor (anti-VEGF) agents, such as Bevacizumab and Ranibizumab (7-10).

Prognosis depends on the severity of involvement. Poor prognostic factors include papillopathy and proliferative retinopathy, which may result in vitreous haemorrhage and tractional retinal detachment (8-11).

This case highlights the importance of recognising the effects that radiation administered to structures near the eye can have on vision. Even though there was no recurrence, and the patient was discharged from ENT and oncology, the

latency of this case demonstrates the need for routine eye tests in patients who have undergone radiotherapy near the orbit. Prompt recognition and referral to ophthalmologists is necessary for all suspected cases to best manage visual loss.

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### Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

### Authors' contributions

AK and ST were involved in designing the study and in the acquisition of the data. AK, MT and ST analysed and interpreted the data. AK wrote the initial draft and MT edited the draft and subsequent versions. AK, MT and ST critically analysed the content. AK and ST confirm the authenticity of all the raw data. AK, MT and ST agree to be 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 authors read and approved the final manuscript.

### Ethics approval and consent to participate

Not applicable.

### Patient consent for publication

Written informed consent was obtained from the patient for inclusion of the images for publication.

### Competing interests

The authors declare that they have no competing interests.

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