

Regression of Macular Drusenoid Retinal Pigment Epithelial Detachments After Plaque Radiation Therapy

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ABSTRACT: The authors describe a case in which drusenoid retinal pigment epithelial detachments (DRPEDs) melted after plaque radiation therapy for an unrelated choroidal melanoma. The patient had a history of bilateral macular DRPEDs prior to palladium-103 plaque therapy. The choroidal melanoma was located in the temporal macula. The central fovea was calculated to receive an incidental radiation dose of 34 Gy. Six months after treatment, an ipsilateral, unilateral reduction of DRPEDs was first noted by comparative fundus photography and optical coherence tomography. From his initial evaluation to his last follow-up, the patient's visual acuity slightly improved from 20/20 to 20/16.

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INTRODUCTION

Radiation therapy has been used to treat exudative macular degeneration.¹⁻³ However, after a review of the key words macular, degeneration, exudative, wet, radiation, brachytherapy, proton, beam, dry, drusen, drusenoid, retinal, pigment, epithelial, and detachment, we found no reports on the effects of radiation on macular drusenoid retinal pigment epithelial detachment (DRPED). Herein we describe a case of regression of DRPEDs after plaque radiation therapy for choroidal melanoma.

CASE REPORT

A 74-year-old man was referred to the New York Eye Cancer Center for a recently enlarging pigmented choroidal tumor in his right eye. In addition, the patient had a history of bilateral dry age-related macular degeneration (AMD). The initial ophthalmic examination revealed a visual acuity of 20/20 in the right eye. Indirect ophthalmoscopy revealed a small choroidal melanoma (largest basal diameter = 5.9 mm, height = 2.0 mm) posterior to the temporal equator. The tumor's posterior margin was measured to be 3.9 mm from the fovea and 7.5 mm from the optic disc. The patient was also noted to have a drusenoid retinal pigment epithelium contour on ophthalmoscopy, and spectral-domain optical coherence tomography was performed on both maculas (Figures 1 and 2). There was no clinical or fluorescein angiographic evidence of choroidal neovascularization.

According to the 2014 consensus guidelines of the American Brachytherapy Society, this American Joint Committee on Cancer T1 tumor was eligible for plaque therapy,⁴ and the treatment involved palladium-103 plaque brachytherapy to a tumor apex dose of 83 Gy over a 7-day duration. Synchronously, the calculated dose to the fovea was 34 Gy (20.2 cGy/h).

At the patient's 6-month follow-up visit, the right "irradiated" macula was noted to contain fewer DRPEDs as documented by fundus photography and optical coherence tomography. Additional follow-up imaging revealed further, unilateral reductions in DRPEDs in the irradiated macula (Figures 1 and 2). During the last follow-up (18 months after treatment), the patient's visual acuity was 20/16, and there was excellent local tumor control.

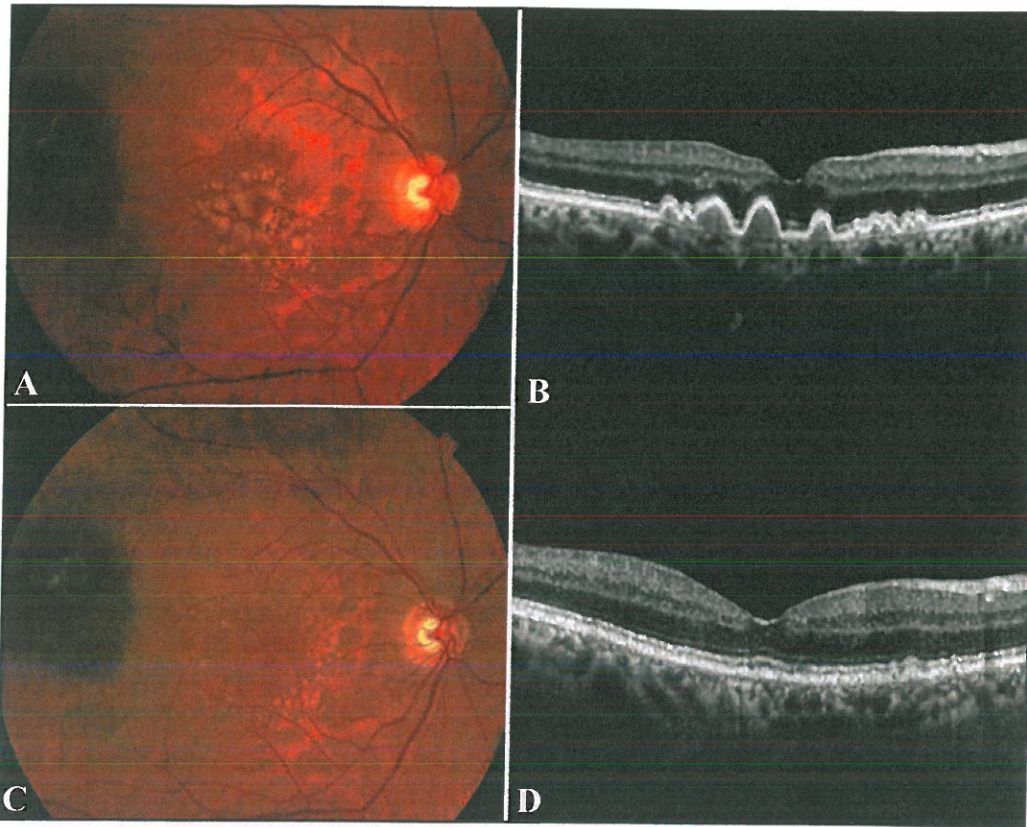


Figure 1. (A) Color fundus photography of the right eye showing choroidal melanoma in the temporal quadrant and the presence of macular drusen prior to radiation. (B) Optical coherence tomography of the right eye showing the presence of drusen prior to radiation. (C) Color fundus photography of the right eye showing radiated choroidal melanoma and a decreased amount of macular drusen 18 months after radiation. (D) Optical coherence tomography of the right eye showing a decreased presence of drusen 18 months after radiation.

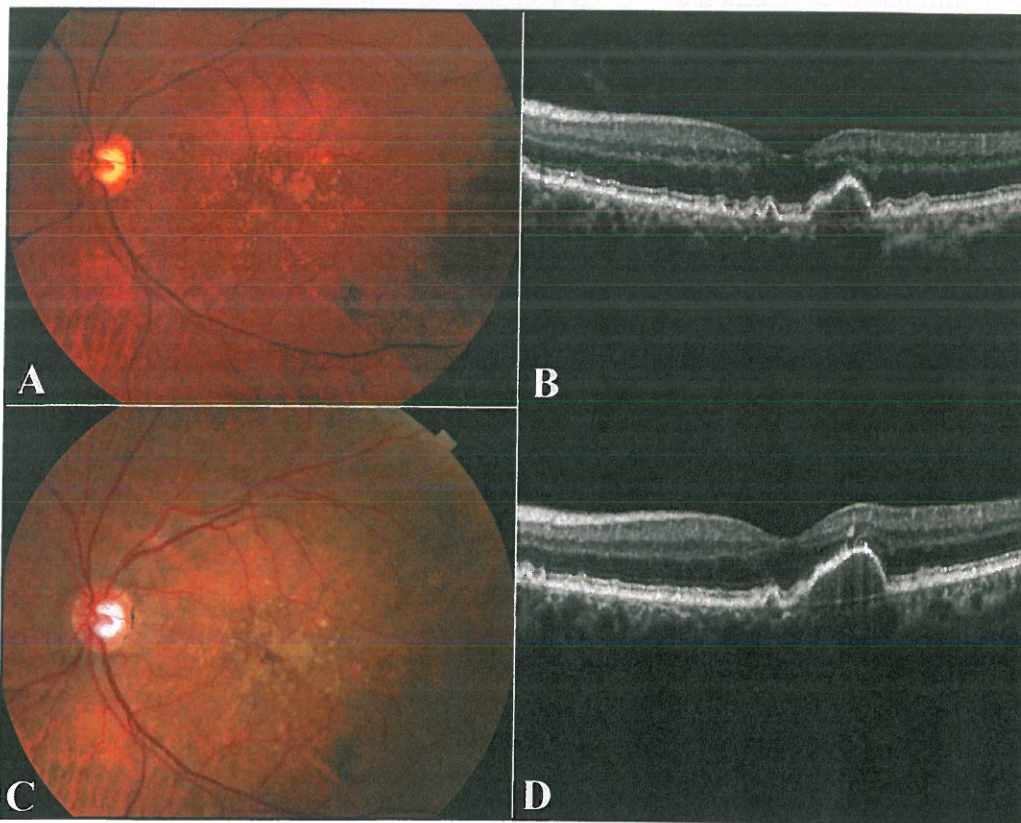


Figure 2. (A) Color fundus photography of the left eye revealing a similar pattern of macular DRPEDs (prior to plaque therapy of the right eye). (B) Initial optical coherence tomography of the left eye also revealing macular DRPEDs (prior to plaque therapy of the right eye). (C) Eighteen months later, color fundus photography of the left eye showing no change in the amount or pattern of macular drusen. (D) Similarly, optical coherence tomography of the left eye shows no decrease in the presence of drusen 18 months after radiation after irradiation of the fellow right eye.

DISCUSSION

Radiation therapy for exudative macular degeneration has been extensively studied and has shown variable success.^{1-3,5,6} However, there have been no research studies on the effects of radiation on DRPEDs. DRPEDs occur when the retinal pigment epithelium is detached from the underlying Bruch's membrane.⁷⁻⁹

Herein we present a patient with a history of macular DRPEDs exposed to collateral ophthalmic plaque radiation. The macula exhibited an obvious, subsequent decrease in DRPEDs drusen within 6 months. There was an even greater decrease in DRPEDs at 18 months. In contrast, the untreated eye remained unchanged over this time course and may have even had a mild increase in DRPEDs (Figure 2). The patient's visual acuity was 20/20 before radiation and 20/16 at the last follow-up visit.

There are no established mechanisms to explain our finding. Radiation is known to induce vascular occlusions and to reduce inflammation.¹⁻³ Therefore, it is possible that the radiation in this case may have reduced etiologic occult neovascularization or inflammation associated with DRPEDs. We acknowledge that this is merely an observation of a single case; however, this finding suggests that radiation may affect the course of AMD.

On the other hand, should others note this phenomenon, there may be an opportunity to treat DRPEDs with low doses of radiation to improve vi-

sion and slow progression to wet AMD. Although the risk of radiation maculopathy may outweigh such a potential benefit, perhaps radiation could be used for rapidly evolving DRPED-affected maculas in patients who cannot tolerate monthly intraocular anti-vascular endothelial growth factor injections.

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