



## Brief Report

## Visual acuity of 20/32, 13.5 years after a retinal pigment epithelium and choroid graft transplantation

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## ABSTRACT

**Purpose:** To present the 13.5-year-survival of an autologous retinal pigment epithelium (RPE) and choroid graft transplantation with good visual acuity results.

**Observations:** A 72-year old patient presented with a 5-weeks-old visual acuity deterioration to excentric finger counting at half a meter. Fundoscopy showed a fibrotic macular scar, a large subretinal hemorrhage, partly recent, combined with intraretinal fluid, blood, and hard exudates. RPE-choroid graft surgery was performed, and visual acuity improved to 20/32, and maintained up until 13.5 years postoperative. Microperimetry performed at the same time revealed a 3.4 dB sensitivity, with fixation on the graft. During the postoperative years glaucoma developed, an uveitis anterior was treated, and to treat a small Coats' like lesion; one bevacizumab injection was administered.

**Conclusions and importance:** A best corrected visual acuity of 20/32 could be achieved and maintained up to 13.5 years after an RPE-choroid graft transplantation, despite an unfavorable preoperative presentation and some early and late complications. This case is a proof of principle that an RPE-choroid graft harvested from the midperiphery can support the macular metabolism up to 13.5 after surgery in a patient with severe exudative AMD. It also represents a rationale for pursuing stem cell derived RPE replacement. Anti-vascular endothelial growth factor injections are nowadays the mainstay of therapy for choroidal neovascularization and/or small hemorrhages and offer good results. Nevertheless, selected patients that cannot benefit from this therapy may profit from an autologous RPE-choroid graft transplantation.

## 1. Introduction

In an era in which age-related macular degeneration (AMD) can be detected early with the help of optical coherence tomography (OCT), and can be treated effectively with several different types of anti-VEGF's (and in selected cases combined with photodynamic therapy (PDT)),<sup>1</sup> there are only a few indications for surgical treatment of AMD.<sup>2</sup> At the moment, surgery may be considered in 3 groups of patients. The first group are patients who have a submacular hemorrhage which exists for more than 14 days, i.e.; which are too late for recombinant tissue plasminogen activator (rtPA) and gas displacement.<sup>3,4</sup> The second group could be patients which developed during anti-VEGF treatment a retinal pigment epithelium (RPE) tear involving the fovea,<sup>5</sup> or a relatively fresh fibrotic scar. The third group are patients who did not respond to anti-VEGF injections.<sup>6</sup> i.e.; All three categories of patients where the outer retina may not yet be irreversibly damaged. We describe a patient treated with an autologous full thickness graft of RPE

and choroid, harvested from the periphery and translocated to the macular area.<sup>7</sup>

## 2. Case report

## 2.1. Pre and postoperative findings

The 72-year-old patient presented in 2003, with a visual acuity (VA) drop of her left eye since 5 weeks to excentric finger counting at half a meter. With funduscopy a large subretinal hemorrhage was visible with a fibrotic macular scar, combined with intraretinal fluid, blood and hard exudates. Retinal pigment epithelium (RPE)-choroid graft surgery was performed in her left eye, with a silicone oil tamponade.<sup>2,7</sup>

Shortly after surgery the intraocular pressure increased to 33 mmHg and topical glaucoma treatment (timolol drops) was started. The oil was removed after 6 months, with again a short intraocular pressure rise to 38 mmHg, which was treated with a topical treatment change to Cosopt

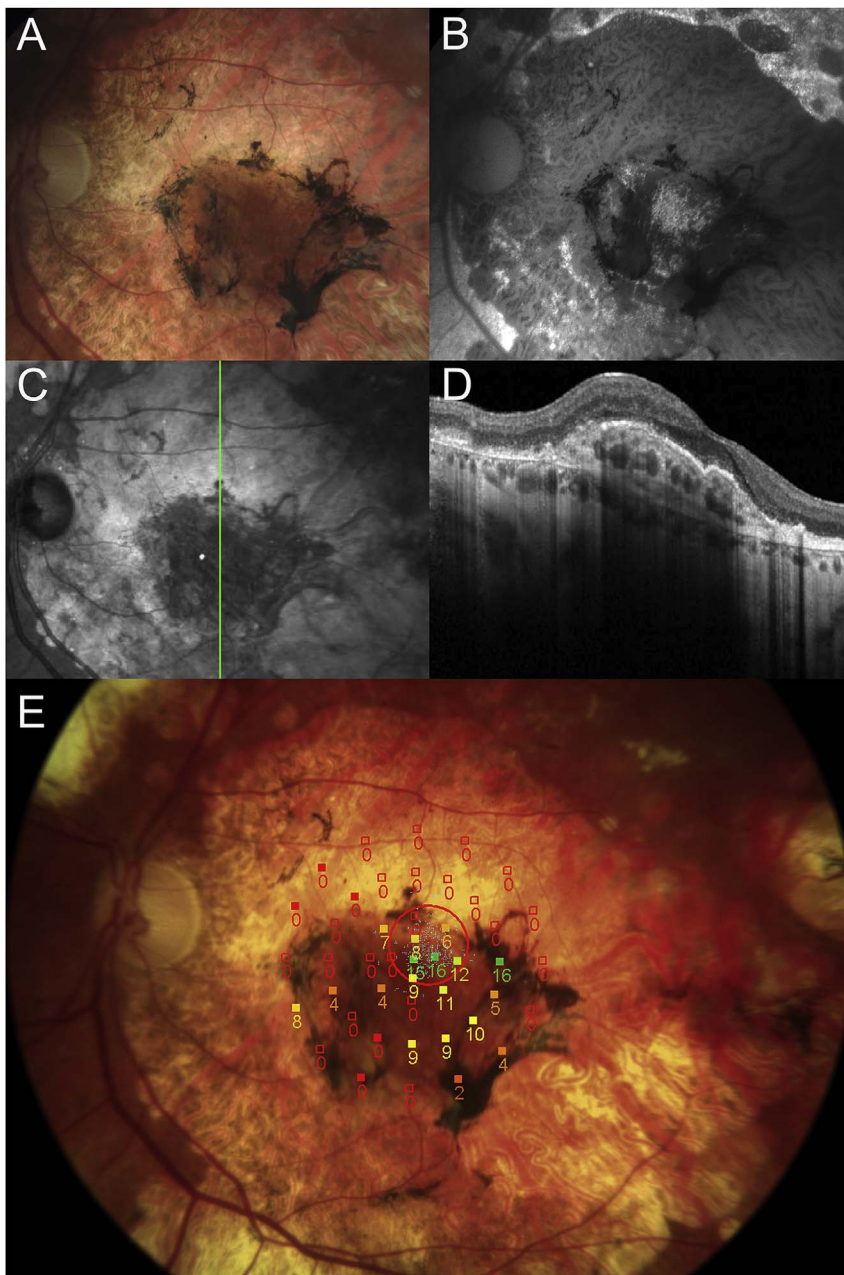
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**Fig. 1.** Retinal pigment epithelium and choroid graft 13.5 years after surgery.

**Legends:** After a temporal retinotomy, the preexistent submacular hemorrhage and fibrosis were removed and an RPE-choroid graft was translocated under the macular area of the retina. (A) Fundus image, (B) Autofluorescence image, (C) Infrared image, (D) Spectral domain optical coherence tomography: vertical scan. The retinal layers, including the fovea, above the graft appear to be intact. The graft itself shows open lumina with some grayshading: depicting the specifics of a well vascularized graft.<sup>11</sup> (E) Microperimetry. A macular, 12°, 10-dB pattern, with 45 test loci and a 2° circle as a fixation target, centered on the macula, was tested. The brightness of the stimuli ranged from 0 to 20 dB. Mean sensitivity was 3.4 dB, with a minimum of 0 dB and a maximum of 16 dB. In the top middle of the graft the autofluorescence shows the brightest reflection, suggesting the presence of lipofuscin in retinal pigment epithelium. This area on autofluorescence corresponds with the area on microperimetry with the highest tested sensitivity, and on OCT the same localization shows good vascularization and good retinal layer configuration.

drops (timolol and dorzolamide). Her intra ocular pressure was well managed by a combination of Cosopt and Monoprost (latanoprost) drops over the last years, but her optic disc shows glaucomatous damage.

Visual acuity improved to 20/80 at 4 months, 20/50 at 9 months and 20/40 at 18 months. After three years 20/32 was reached. She maintained this VA with minor changes over the years up until 9.5 years postoperative, when she presented with a visual acuity drop to 20/200 and an uveitis anterior in her left eye, which responded to topical treatment. Thereafter VA improved again to 20/63. A small Coats' like lesion<sup>8</sup> was then visible on fluorescein angiography nasally of the optic nerve. The lesion stabilized after one bevacizumab injection. She had a visual acuity of 20/32 at 13.5 years after surgery. Reading acuity at that time was 0.42 logRAD and Sine Amsler score was 1 (almost no distortion).<sup>9</sup> On microperimetry a 3.4 dB sensitivity was documented with fixation on the graft (Fig. 1).

## 2.2. Materials and methods

The study and data accumulation were conducted with approval of the Institutional Review Board, and patients' Informed Consent was obtained.

At the Rotterdam Eye Hospital, The Netherlands, the submacular fibrovascular scar and hemorrhage was removed through a small paramacular temporal retinotomy, with a full-thickness graft of RPE and choroid taken from the midperiphery.<sup>2,7</sup>

Microperimetry was performed on a Nidek - MP1 microperimeter with software version 1.7.3. The Goldman III stimulus size was used with a 200 ms projection time. A Cartesian pattern was tested automatically, centered on the graft, with a staircase 4-2-1 threshold strategy. The brightness of the test stimuli ranged from 0 to 20 dB (400–4 apostilb).<sup>10</sup>

### 3. Discussion

Fortunately, anti-VEGF therapy is the first choice in most patients and surgery may be an option for some patients where anti-VEGF is not effective or no longer effective.

This case report documents that visual acuity after a successful autologous RPE-choroid graft transplantation can be maintained at a level of 20/32 after 13.5 years, despite several complications in this patient which were: a small Coats' like lesion, glaucomatous damage, and uveitis anterior.

This surgery is limited to patients with advanced exudative AMD which still have a (partly) viable outer retina in the macular area. Current techniques as spectral domain OCT are therefore almost mandatory for surgical decision making.<sup>11</sup>

Even though at the time of presentation anti-VEGF's were not routinely available, today our patient would neither have been eligible for anti-VEGF's or rtPA with gas, which underscores the potential long-term effectiveness of this surgery.

#### Patient consent

The patient orally consented to publication of the report. This report does not contain any personal information that could lead to the identification of the patient.

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##### Conflict of interest

The following authors have no financial disclosures: EJTvZ, KJM, JvM.

#### Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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