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CLINICAL INVESTIGATION

Endoscope-assisted vitrectomy for retinal detachment in an eye with microcornea

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Abstract
Background We report a case of an endoscope-assisted vitrectomy for the treatment of retinal detachment associated with microcornea in a normal size globe.
Subjects A 26-year-old Japanese man was referred after complaining of visual acuity loss OD. Both eyes became aphakic because of surgery for congenital cataracts in infancy. The visual acuity was 0.02 OD. The corneal diameter was 7.5 × 7.0 mm and axial length was 23.89 mm. Retinal detachment was suspected, although the details were obscure because of nystagmus and small pupils. Endoscope-assisted, 23-gauge pars plana vitrectomy and encircling buckling were performed, and reattachment of the retina was achieved.
Observations Retinal breaks were identified, and peripheral parts of the retina were observed by endoscopy.
Conclusions Endoscope-assisted vitrectomy may be advantageous for the management of detachment in an eye with microcornea.

Keywords Endoscope · Vitrectomy · Microcornea · Retinal detachment

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Introduction

Microcornea is a rare, congenital eye malformation in which the cornea and the anterior segment of the eye are smaller than normal. Microcornea is defined as an adult cornea with a horizontal diameter of 10–11 mm or less [1–3]. Multiple malformations in the eyes are frequent. Auffarth et al. [1] define true or complex microphthalmos as an eye with a small anterior segment with a short axial length, relative anterior microphthalmos (RAM) with a normal axial length, and complex dysgenesis with a long axial length.

There are reports of retinal detachment associated with microcornea. In some cases, the retinal detachments were treated with combined pars plana vitrectomy and scleral buckling procedures. We reported the efficacy of endoscope-assisted vitrectomy to preoperatively manage pseudophakic or aphakic retinal detachment with undetected retinal breaks [4]. Endoscopy allows for the observation of any part of the retina with no limitation caused by factors such as corneal opacities, rim of the intraocular lens, lens cortical remnant, lens capsular opacities, small pupil, or vitreous opacities.

We describe a case of retinal detachment associated with microcornea and normal axial length that was treated with endoscope-guided 23-gauge pars plana vitrectomy.

Case

A 26-year-old Japanese man was referred to us complaining of visual acuity loss OD. Both eyes became aphakic because of surgery for congenital cataracts in infancy. The best-corrected visual acuity after cataract surgery was 0.08 OD and 0.3 OS. He lost light perception in his left eye in spite of several vitrectomy surgeries for retinal detachment

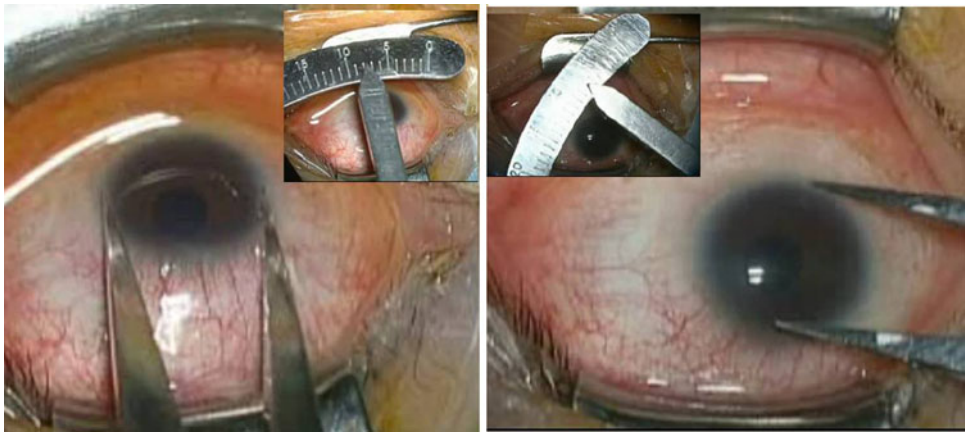

Fig. 1 Corneal diameter was 7.5 mm horizontally and 7.0 mm vertically

because of a large retinal tear, which occurred when he was 19 years old. He appeared to be of normal intelligence, had no dysmorphic features, and no apparent family history of eye diseases.

On initial examination, the patient's best-corrected visual acuity was 0.02, and intraocular pressure was 9 mmHg OD. Slit lamp examination revealed a shallow anterior chamber. The pupil of the right eye was centrally located and 2 mm in diameter. Proliferative vitreoretinopathy (PVR) was suspected after ophthalmoscopy and echographic measurement. However, the details were obscure because of nystagmus and small pupils. The corneal diameter was 7.5 mm horizontally and 7.0 mm vertically (Fig. 1), and the axial length was 23.89 mm.

Subsequently, 23-gauge three-port pars plana vitrectomy, using an endoscope (Fiber Tech, Tokyo, Japan) in combination with encircling buckling, was performed under retrobulbar anesthesia. An endoscope was inserted through a corneal side port, and sclerotomy was conducted under endoscopic view 3.0 mm posterior to the limbus. Endoscopy revealed a narrower than normal pars plana, existence of white deposits at the ora serrata (Fig. 2), a pale optic disc, attenuated retinal vessels, and total retinal detachment with a thick proliferative membrane (PVR grade C-3). Microscopic views of the retina with contact lenses for children were limited even after dilation of the pupil with the iris retractors (Fig. 3). We could not detect retinal breaks even with scleral depression. The retinal breaks in the ora serrata at 1000 hours were identified under an endoscope (Fig. 4). Encircling buckling with a scleral band (no. 240, MIRA Inc., Brentwood, MO, USA) and sleeve (no. 270, MIRA) was conducted 17 mm from the limbus. After the core vitrectomy, conducted under microscopic view, and peripheral vitrectomy, conducted under endoscopic view, membranotomy was achieved under both views. Reattachment of the retina was achieved by using perfluorocarbon liquid. Prior to silicon oil injection, endolaser and cryoretinopexy were conducted under endoscopic view (Fig. 5). Peripheral iridectomy was made at 0600 hours. The patient's visual acuity recovered up to 0.04. Fourteen months after the initial surgery, the silicone oil was removed, and the retina remained attached.

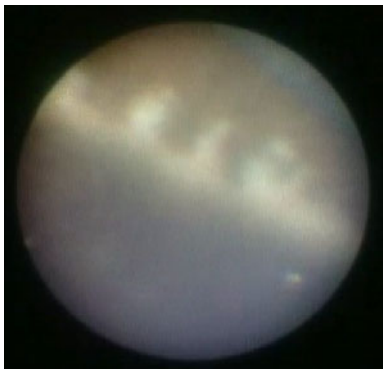

Fig. 2 Endoscopy revealed a narrower than normal pars plana and the existence of white deposits at the ora serrata

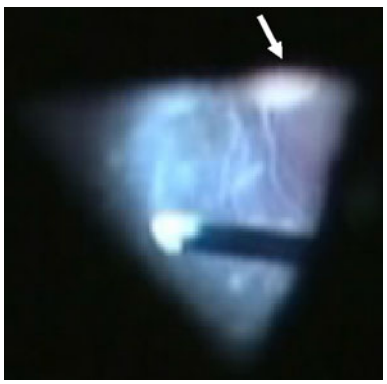

Fig. 3 Microscopic view of the retina with a 30° contact lens. The image was restricted around the optic disc (*arrow*) even after the dilation of the pupil with the iris retractors

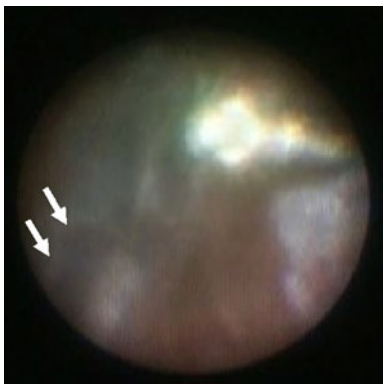

Fig. 4 Retinal breaks (*arrows*) in the ora serrata at 1000 hours were identified under the endoscope

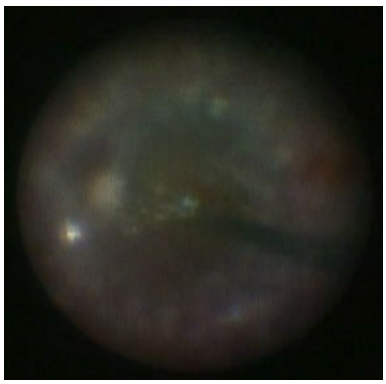

Fig. 5 The fundus after completion of surgery. The optic disc was pale, and laser flecks could be seen around the arcade. The retina was reattached

Discussion

Microcornea is defined as an adult cornea with a horizontal diameter of 10–11 mm or less [1–3]. Multiple malformations such as congenital cataract, lens subluxation, glaucoma, choroidal coloboma, and a shallow anterior chamber are frequently associated with microcornea [5–14]. In most reports of microcornea, microphthalmia has been observed as well. However, it can also be associated with normal size globes or even with macrophthalmia [1, 9, 11–13]. The terms relative anterior microphthalmos (RAM) and isolated microcornea (IM) are used to describe a condition of the eye with a normal axial length but a disproportionately smaller anterior segment [1, 14]. These were observed in the current case as well. Although microcornea is described as both an autosomal recessive and autosomal dominant disorder, sporadic cases such as the current one are also reported [9].

There are few reports of retinal detachment associated with microcornea, except in the presence of choroidal coloboma, macrophthalmia or with a history of cataract surgery. Retinal detachment following congenital cataract surgery tends to occur 10 years or more after the surgery, and the average age of onset is the 3rd decade of age [15]. In the present case, retinal detachment occurred at the age of 26 years, about 20 years after cataract surgery.

Auffarth et al. [1] evaluated morphometric data such as corneal diameter, anterior chamber depth, and lens thickness of the relative anterior microphthalmos. However, no data are provided about the width of the pars plana. Usually, sclerotomy sites were selected 2.5 mm posterior to the limbus in eyes with microcornea [10, 11]. We conducted sclerectomy 3.0 mm posterior to the limbus under endoscopic observation.

To identify the preoperatively undetected retinal break, scleral depression is commonly performed. However, it is often difficult to find a retinal tear associated with the history of cataract surgery, which would be located anterior to the small breaks, especially in patients with anterior microphthalmos. We reported the efficacy of endoscope-assisted vitrectomy to manage pseudophakic or aphakic retinal detachment with preoperatively undetected retinal breaks [4]. In the current case, it was difficult to observe the peripheral retina, and we could not find any breaks under microscopic views. We identified the retinal breaks at the ora serrata using an endoscope. Using an endoscope enables the clinician to observe the peripheral parts of the retina, the vitreous base, pars planar, and the pars plicate without any manipulation of the anterior chamber, sclera depression, or excessive retinopexy, which may cause postoperative inflammation and proliferative changes. Images obtained with the endoscope are clearer and larger than those obtained with a microscope or a wide viewing system. The images obtained with the endoscope can facilitate the detection of retinal breaks without any subretinal dye extrusion or dynamic sclera depression. In a microcornea with normal ocular axial length, especially with a small pupil, the morphological features prevent the observation of the peripheral retina even with a scleral depression and/or with a wide-angle viewing system. In such conditions, endoscopic surgery is advantageous in identifying the retinal breaks and treating them. Endoscope-assisted vitrectomy is, therefore, effective in the management of retinal detachments associated with microcornea.

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