Clinical Case Report

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Rhegmatogenous retinal detachment with a giant tear located in the intermediate periphery

Two case reports

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Abstract

Rationale: We experienced 2 cases of retinal detachment (RD) with giant tears located in the intermediate periphery of the fundus. In this case report, we investigated the clinical characteristics in these 2 cases.

Patient concerns and diagnoses: Case 1 involved a 63-year-old male, who became aware of metamorphopsia and decreased visual acuity (VA) in his left eye. Upon examination, he was diagnosed with a giant tear at the margin of the intermediate peripheral lattice degeneration. Case 2 involved a 54-year-old male, who became aware of decreased VA in his right eye. Upon examination, he was diagnosed with vitreous hemorrhage and a giant tear located in the upper intermediate periphery. In these 2 cases, there was no obvious previous or familial history.

Interventions: In both cases, reattachment was achieved by performing vitrectomies.

Outcomes: These 2 cases were characterized by the refraction being close to emmetropia due to the flat corneal curvature, even though there was a long axial length and the eyeballs were spherically large. In both cases, the postoperative clinical course outcome was favorable and no complication occurred

Lessons: Our findings indicate that intermediate peripheral giant tears may occur in spherically large eyeballs, and that vitreous surgery is effective in such cases. Since the risk of the onset of RD in the fellow eye is thought to be high, strict postoperative follow-up is necessary.

Abbreviations: IOP = intraocular pressure, LT = intraocular pressure in the left eye, LV = visual acuity in the left eye, RD = retinal detachment, RT = intraocular pressure in the right eye, RV = visual acuity in the right eye, VA = visual acuity.

Keywords: giant tear, intermediate periphery, lattice degeneration, retinal detachment, spherically large eyeball, vitrectomy

1. Introduction

Giant retinal tears usually develop along the posterior edge of the vitreous base, and it is rare for them to occur at the posterior side of the equator.[1] Risk factors for a giant retinal tear include trauma,[2] high myopia,[3] atopic dermatitis,[4] Stickler syndrome and other vitreoretinal dystrophies,[5] and Marfan's syndrome,[6] etc. Here, we report 2 cases of retinal detachment (RD) caused by giant retinal tears in the intermediate periphery with no systemic disease and the case-specific clinical characteristics.

2. Case presentation

2.1. Case 1

Case 1 involved a 63-year-old male who became aware of metamorphopsia and decreased visual acuity (VA) in his left eye. Upon initial examination, his VA was RV = 0.4 (1.2 × S–1.0 D = C−1.0 A× 80°) and LV = 0.2 (0.3 × S + 1.0D = C−1.0 A× 90°), and intraocular pressure (IOP) was RT = 19 mm Hg and LT = 12 mm Hg. The patient had no medical history or familial history to disclose. In both eyes, the horizontal and vertical corneal diameters were 11.75 mm and 11.00 mm, respectively. Axial length was 26.13 mm in the right eye and 25.81 mm in the left eye. The corneal curvature radius was 8.36 mm (horizontal) and 8.21 mm (vertical) in the right eye and 8.37 mm (horizontal) and 8.30 mm (vertical) in the left eye, with the shape of the corneal being flatter than normal. Despite the long axial length, the refractive index indicated emmetropia or mild myopia. A wide area of lattice degeneration was recognized slightly behind the equator from the superior nasal to the inferior temporal of the right-eye fundus. In the left eye, a giant retinal tear of approximately 140° was observed in the margin of the lattice degeneration in the upper intermediate periphery, which resulted in bullous RD at the 2 upper quadrants (Fig. 1A). For the initial surgery, we performed

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Informed consent: Informed written consent was obtained from all patients for publication of this case report and accompanying images

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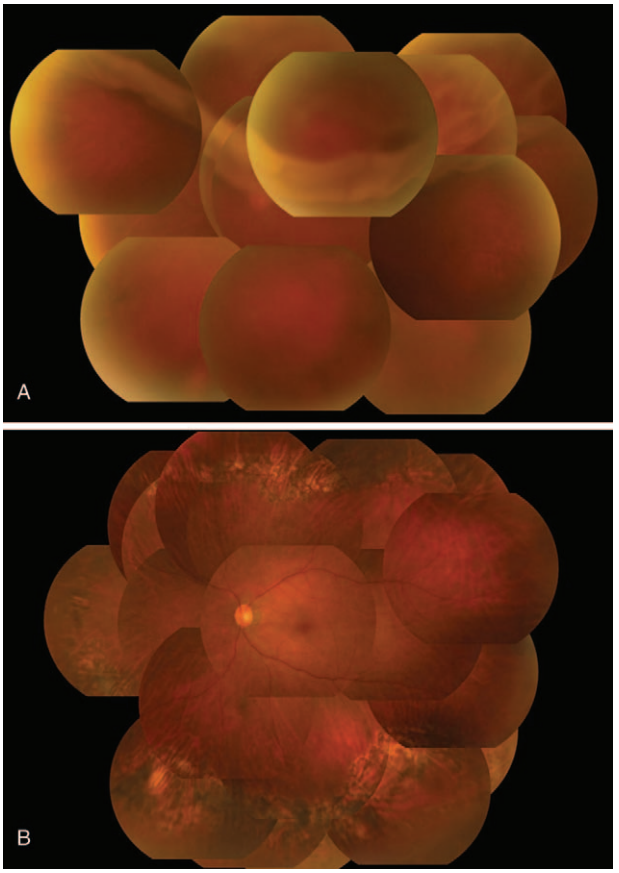

Figure 1. Fundus photograph of the left eye in Case 1. A giant tear of approximately 140° was observed in the margin of the lattice degeneration in the upper intermediate periphery, which resulted in bullous retinal detachment (RD) at the 2 upper quadrants (A). After vitreous surgery, the retina was successfully reattached and the patient's corrected visual acuity improved to 1.0 (B). RD = retinal detachment.

lensectomy and vitrectomy. The vitreoretinal adhesion in the lattice degeneration area was strong, so we also resected the lattice degeneration in order to release the vitreoretinal traction. After performing vitreous shaving in the peripheral area, we extended the retina with perfluorocarbon liquid, and then performed endophotocoagulation around the tear. Next, we replaced the perfluorocarbon liquid with approximately 8 mL of silicone oil. Three months later, we removed the silicone oil and performed a secondary intraocular lens (IOL) implantation. Post-surgery, the corrected VA improved to 1.0 (Fig. 1B). For the patient's right eye, we performed prophylactic laser photocoagulation in the lattice degeneration. However, 1 year later, RD occurred due to multiple tears in the lattice degeneration margin and a vitrectomy was performed in order to achieve reattachment.

2.2. Case 2

Case 2 involved a 54-year-old male who became aware of decreased VA in his right eye. Upon initial examination, the VA was RV = 0.01 (0.02 × S−1.5 D = C−0.5 A × 90°) and LV = (1.0 × S−2.75 D = C−0.5 A × 90°), and IOP was RT = 15 mm Hg and LT = 17 mm Hg. The patient had no medical history or familial history to disclose. In both eyes, the horizontal and vertical corneal diameters were 11.5 mm and 11.00 mm, respectively. Axial length was 25.07 mm in the right eye and 25.79 mm in the left eye. The corneal curvature radius was 8.01 mm (horizontal) and 7.89 mm (vertical) in the right eye and 8.11 mm (horizontal) and 7.97 mm (vertical) in the left, with the shape of the cornea being flatter than normal. Despite the long axial length, the refractive index indicated mild myopia. The right-eye fundus was not visible due to a vitreous hemorrhage. A wide area of lattice degeneration was observed in the left eye from the upper to the lower temporal quadrant. For the initial surgery, we performed lensectomy and vitrectomy in the right eye. When the vitreous hemorrhage was removed, a giant retinal tear of approximately 140° in the lattice degeneration margin of the upper intermediate periphery and bullous RD was observed (Fig. 2A). We performed the same procedures as described above for Case 1, and replaced the perfluorocarbon liquid with approximately 8 mL of silicone oil. Three months later, we extracted the silicone oil and performed a secondary IOL implantation. Post-surgery, the corrected VA in his right eye improved to (1.0) (Fig. 2B). Three years later, RD occurred in the left eye due to multiple tears in the lattice degeneration margin

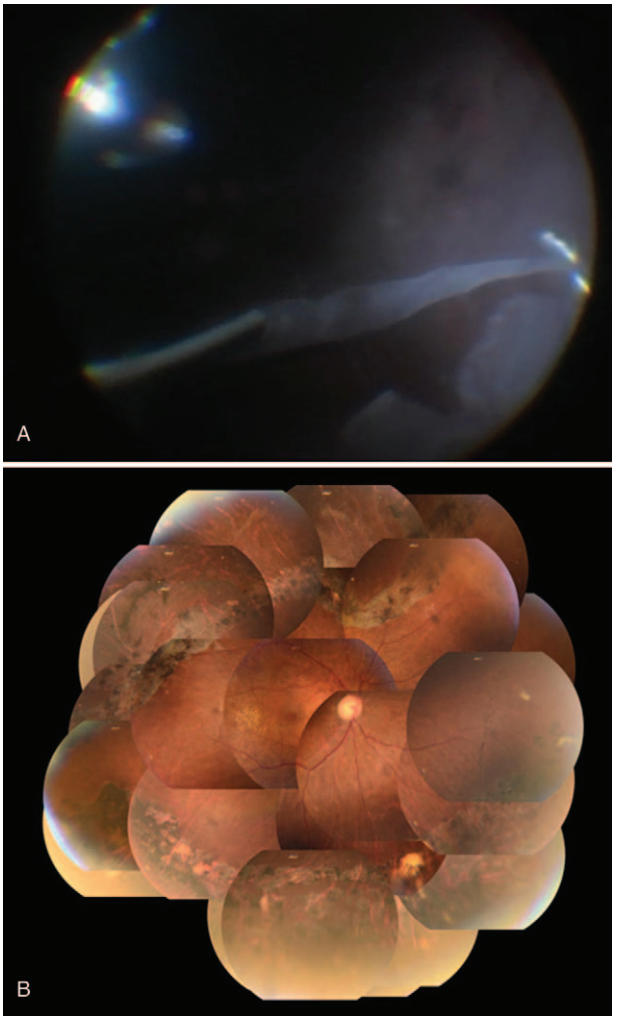

Figure 2. Intraoperative findings and postoperative fundus photograph of the right eye in Case 2. A giant tear of approximately 140° in the lattice degeneration margin of the upper intermediate periphery and bullous RD was observed (A). After vitreous surgery, the retina was successfully reattached and the postoperative corrected visual acuity improved to 1.0 (B). RD = retinal detachment.

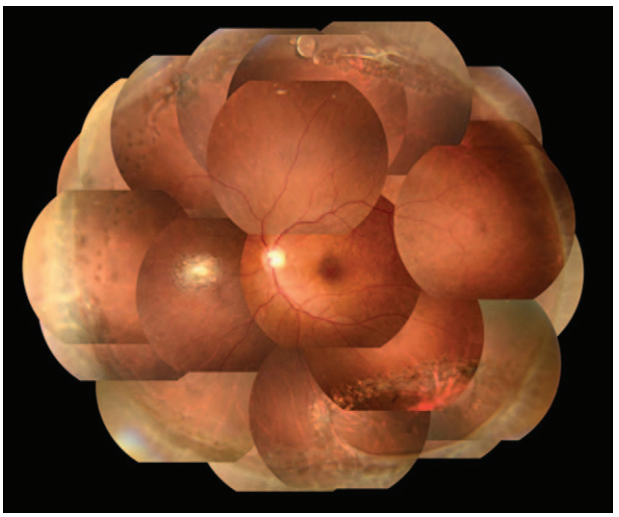

Figure 3. Postoperative fundus photograph of the left eye in Case 2. Three years after surgery, RD occurred in the left eye due to multiple tears in the lattice degeneration margin and a vitrectomy was performed in order to achieve reattachment.

and a vitrectomy was performed in order to achieve reattachment (Fig. 3).

3. Discussion

Giant retinal tears are defined as tears >90° in the circumferential direction, and reportedly account for approximately 1.5% of the cases of full RD.[1] Tears are believed to normally form in the posterior edge of the vitreous base in many cases, and in approximately 70% of the cases, the tear occurs in eyes with myopia. As for the clinical characteristics of the 2 cases presented in this study, the giant tears did not form at the posterior edge of the vitreous base, but rather along the posterior edge of the lattice degeneration in the intermediate periphery. Moreover, the shape of the cornea was flat, and despite the long axial length, refraction indicated emmetropia or mild myopia. Unlike cases of normal axial myopia, the eyeball was long, not only from the front to back, but also in terms of the equatorial diameter, and spherically large. Considering that fact that approximately 8 mL of silicone oil was injected during surgery in both cases, we theorize that the eyeballs were, in fact, large. Furthermore, in both cases, a wide area of lattice degeneration was also observed in the fellow eye, and despite preventive laser photocoagulation being performed in Case 1, RD reoccurred after a period of time had elapsed. In Case 2, follow-up observation was performed due to a concern regarding vitreous contraction caused by laser photocoagulation, and 3 years later, RD with multiple tears occurred in the lattice degeneration margin.

Megalophthalmos, congenital glaucoma, and Marfan's syndrome can be considered as possible disorders that cause spherically-large eyeballs, such as those seen in these 2 cases. There are a number of reports regarding RD accompanied by megalophthalmos. [7–9] Ahmadieh et al investigated megalophthalmos-related eye complications in 48 eyes of 24 cases, and reportedly found vitreous liquefaction degeneration in 34 eyes (73.9%) and a high percentage of RD in 18 eyes (37.5%).[7] Moreover, they reported that of those 18 eyes, giant tears had occurred in 2 eyes and multiple tears had occurred in 4 eyes. Although there was no description regarding the portions with the giant tears, obvious lattice degeneration was reportedly observed in 5 eyes (10.8%), which is slightly higher than normal. Occasionally, there are reports of RD in eyes with congenital glaucoma. Cooling et al[10] reportedly observed 18 cases of rhegmatogenous RD in eyes with congenital glaucoma. Of those 18 cases, giant tears were reportedly observed in 4 eyes, with the locations of the giant tears being the vitreous base in 2 eyes and in front of the equator in the other 2 eyes. In addition, they theorized in that study that there were many variations of the area in which the giant tear occurs, and that it depends on abnormalities in the growth stages of the eyeball. Dowler et al[11] reported giant-tear RD in 4 eyes of 3 cases with congenital glaucoma accompanied by aniridia. All of those 3 cases were children, and the authors theorized that spherical expansion of the eyeball was one of the factors behind the formation of the giant tears. Rao and Videkar reported the case of a 12-year-old boy with congenital glaucoma who was found to have wide lattice degeneration in the upper region of both eyes, which resulted in the formation of a tear and, ultimately, bullous RD.[12]

It should be noted that that the eyeball is known to be spherically expanded in cases of Marfan's syndrome.[13] Dotrelova et al[14] investigated 18 eyes of 13 Marfan's syndrome cases that resulted in rhegmatogenous RD, and reportedly observed giant tears in 3 of those 18 eyes. They reported that in 1 of those 3 eyes, the giant tear formed in the intermediate periphery. Moreover, they reported that in 1 case, rather than a giant tear, multiple large tears in a somewhat deep portion from the equator were observed and were believed to be the preliminary stage of a giant tear. Sharma et al. investigated 53 eyes of 145 cases of Marfan's syndrome that led to rhegmatogenous RD, and reportedly observed giant tears in 6 of those eyes (11.3%).[6] Although there was no description in regard to the position of the giant tears, the authors theorized that in over 50% of the cases the tears occurred in front of the equator.

In the 2 cases presented in this study, no specific eye disease or systematic disease, such as those described above, was observed. However, it should be noted that a spherically large eyeball is a characteristic of those 3 above-mentioned diseases. In the 2 cases in this present study, RD occurred in both eyes, thus leading us to postulate that these types of spherically large eyeballs have some kind of predisposition that makes them susceptible to a giant-tear RD. As to why these types of eyeballs are somehow susceptible to giant tears is a matter for speculation. However, one feasible supposition is that the retina near the equator extends excessively, lattice degeneration forms easily over a wide area due to the eyeball expanding spherically, and, simultaneously, vitreous liquefaction degeneration easily occurs due to an increase in vitreous volume.

Freeman[15] previously reported that in cases that led to a giant-tear RD, RD occurred in the fellow eye in 29 to 43% of the cases and giant tears occurred in 12.8%. In both cases in this present study, the same type of RD occurred in the fellow eye. Thus, our findings suggest that in cases with a spherically large eyeball, there is a high risk of RD caused by tears in the intermediate periphery occurring in both eyes. Moreover, in cases where there is lattice degeneration over a wide area, there is a possibility that multiple tears will merge together to form a giant tear. Therefore, strict follow-up observation is necessary in such cases.

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