

Case Report

Acute Onset of Dense Vitreous Hemorrhage Associated with Retinal Arterial Macroaneurysm on the Optic Disc

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Keywords

Retinal arterial macroaneurysm · Vitreous hemorrhage · Optic disc · Pars plana vitrectomy

Abstract

We present a rare case of acute onset of dense vitreous hemorrhage (VH) associated with ruptured retinal arterial macroaneurysm (RAM) on the optic disc. A 63-year-old Japanese man had undergone phacoemulsification combined with pars plana vitrectomy (PPV) including internal limiting membrane peeling in the right eye for a macular hole approximately 1 year before presentation. His decimal best-corrected visual acuity (BCVA) in the right eye was stable at 0.8 with no recurrence of macular hole. He visited our hospital emergently prior to his regular postoperative visit for a sudden decrease in visual acuity in the right eye. Clinical examinations and imaging tests revealed dense VH in the right eye, and we could not observe the fundus. B-mode ultrasonography of the right eye showed dense VH without retinal detachment and a bulge on the optic disc. His BCVA decreased to hand movement in the right eye. He had no medical history of hypertension, diabetes, dyslipidemia, antithrombotics, or ocular inflammation in both eyes. Accordingly, we performed PPV on the right eye. During vitrectomy, we found a RAM on the optic disc with retinal hemorrhage on the nasal side. We carefully reviewed the preoperative color fundus photographs and noticed that RAM was not present on the optic disc at the time of his visit 4 months earlier. After surgery, his BCVA improved to 1.2, the color of the RAM on the optic disc changed to grayish yellow, and optical coherence tomography images showed a shrunken RAM. RAM on the optic disc could cause VH early after its onset.

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Introduction

Retinal arterial macroaneurysms (RAMs) are mostly observed along the temporal arcade arteries with an even distribution between the superior and inferior arteries [1–3]. The cilioretinal arteries and optic nerve head are rarely involved [1–3]. The incidence of RAM on the optic disc has been reported to be approximately 3–8% in all patients with RAMs [1, 3]. Most common complications of RAM on the optic disc include retinal hemorrhages, retinal exudates, branch retinal artery occlusion (BRAO), and vitreous hemorrhages (VH) [1–5]. Although RAMs can cause VH [1–3, 5], their frequency and timing of VH occurrence on the optic disc is unknown [6–12]. To the best of our knowledge, no reports have clearly demonstrated the early onset of VH after development of RAM on the optic disc. Herein, we report a rare case of acute onset of dense VH associated with RAM development on the optic disc within 4 months.

Case Report/Case Presentation

A 63-year-old Japanese man visited our hospital emergently prior to his regular postoperative visit on July 12, 2022, with a sudden decrease in visual acuity of the right eye. He had no history of hypertension, diabetes, dyslipidemia, antithrombotics, or ocular inflammation in both eyes. He underwent phacoemulsification combined with pars plana vitrectomy (PPV) in the right eye for a macular hole on May 13, 2021. In addition, his decimal best-corrected visual acuity (BCVA) was stable at 0.8 4 months prior to emergent presentation (shown in Fig. 1a–c, d).

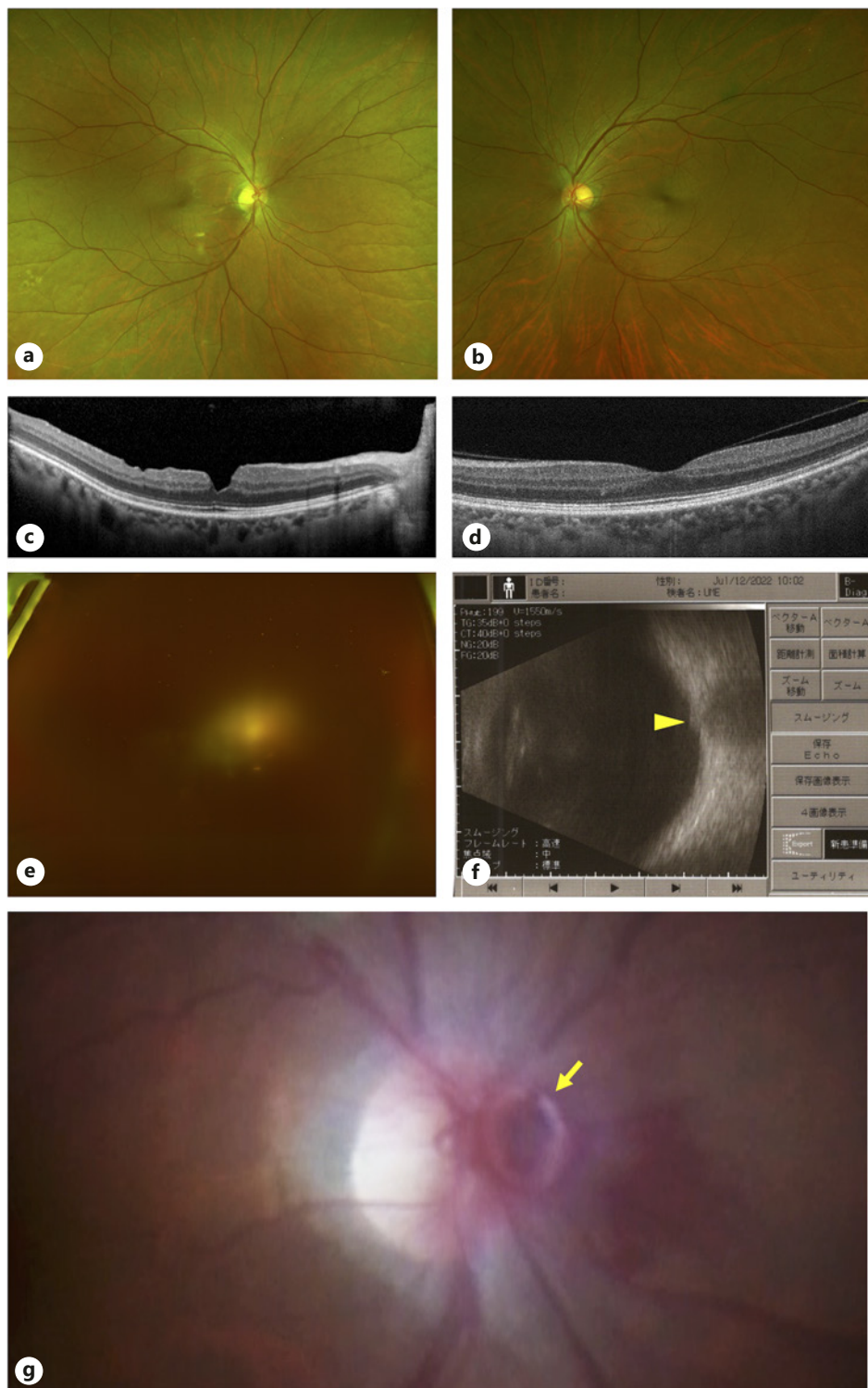
Upon examination, BCVA reduced to hand movement in the right and 1.2 in the left eye. The intraocular pressure was 21 mm Hg in the right and 12 mm Hg in the left eye. We could not observe the fundus in his right eye due to dense VH (shown in Fig. 1e). B-mode ultrasonography of the right eye revealed dense VH without retinal detachment and a bulge on the optic disc (shown in Fig. 1f). Moreover, B-mode ultrasonography of the right eye revealed that the vitreous completely separated from the optic nerve head. No abnormality was observed in the left eye.

On July 14, 2022, the patient underwent PPV in the right eye. During vitrectomy, we found a RAM on the optic disc with retinal hemorrhage on the nasal side (shown in Fig. 1g). We did not observe any pulsation or blood oozing from the RAM. Furthermore, we did not observe any submacular hemorrhage, intraretinal hemorrhage, or edema in the macula. The RAM was not treated intraoperatively. Except for the ruptured RAM, there were no other intraoperative findings that could cause VH.

Fig. 1. Pre- and intraoperative findings. **a** Fundus photograph 4 months prior to the emergent presentation for the right eye. No abnormality is observed. **b** Fundus photograph 4 months prior to the emergent presentation for the left eye. No abnormality is observed. **c** Horizontal OCT image 4 months prior to the emergent presentation for the right eye. The OCT image shows successful closure of macular hole with restoration of the outer retinal layers and saw-tooth pattern of the inner retinal surface consistent with internal limiting membrane peeling. **d** Horizontal OCT image 4 months prior to the emergent presentation for the left eye. The OCT image shows adhesion of the posterior vitreous cortex on the retinal surface and no abnormality. **e** Fundus photograph on the day of the emergent presentation with dense VH of the right eye. Fundus could not be observed. **f** B-mode ultrasonography on the day of the emergent presentation for the right eye. Dense VH without retinal detachment and a bulge on the optic disc (arrowhead) are observed. **g** Fundus photograph of the RAM during surgery for the right eye. During vitrectomy, RAM on the optic disc (arrow) with retinal hemorrhage at the nasal side is seen. No pulsation of the RAM and blood oozing from it are observed. OCT, optical coherence tomography; RAM, retinal arterial macroaneurysm; VH, vitreous hemorrhage.

(For figure see next page.)

On July 15, 2022, the VH almost disappeared (shown in Fig. 2a) and optical coherence tomography (OCT, Spectralis; Heidelberg Engineering, Heidelberg, Germany) revealed a RAM on the disc (shown in Fig. 2b) and decimal BCVA improved to 1.0. On July 22, 2022, VH completely disappeared (shown in Fig. 2c) and OCT showed a decrease in the RAM on the disc (shown in Fig. 2d) and decimal BCVA was stable at 1.0.



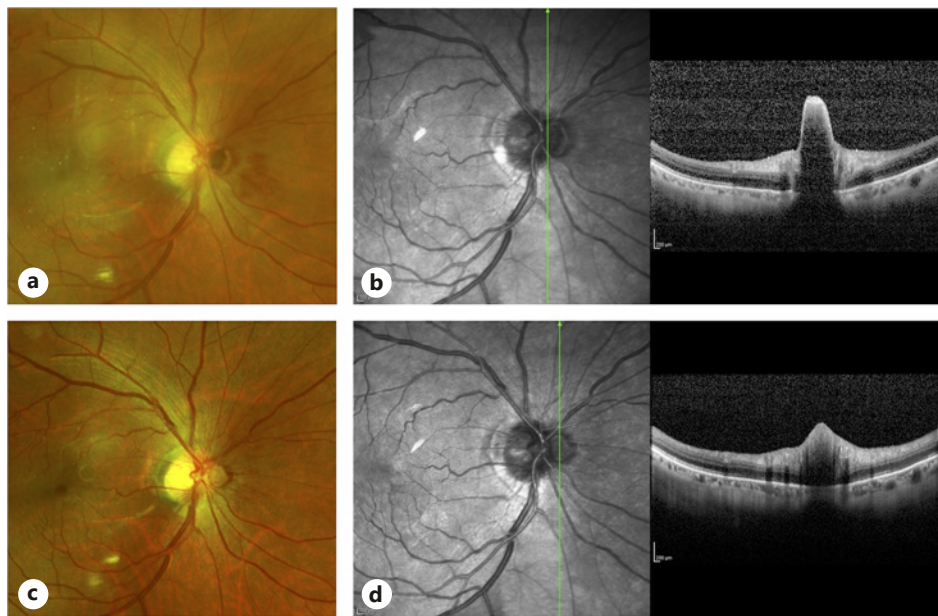


Fig. 2. Postoperative findings of the right eye. **a** Fundus photograph 1 day after surgery. No pulsation of the RAM on the optic disc and blood oozing from it are observed. **b** Vertical OCT image across the RAM 1 day after surgery. The OCT image shows saccular bulge. **c** Fundus photograph 8 days after surgery. Color of the RAM on the optic disc changed to grayish yellow, suggesting RAM thrombosis. **d** Vertical OCT image across the RAM 8 days after surgery. The OCT image shows a shrunken RAM. OCT, optical coherence tomography; RAM, retinal arterial macroaneurysm.

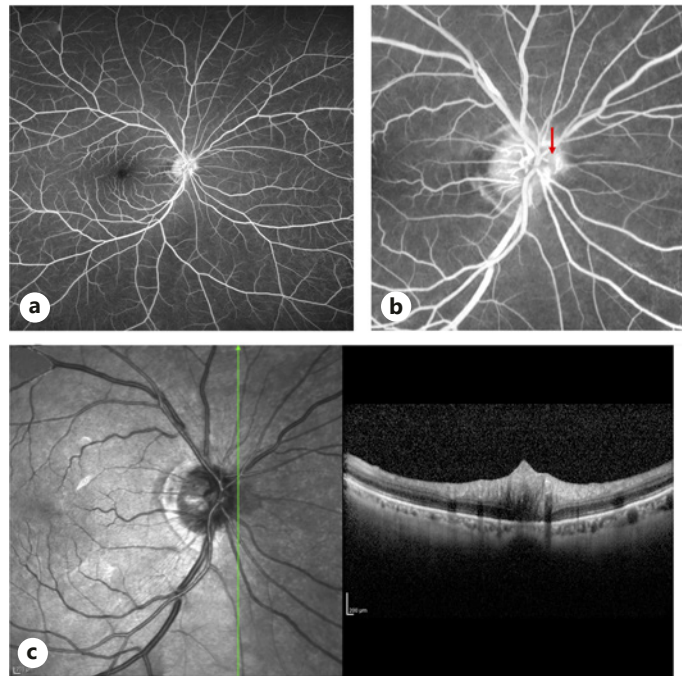
The patient's most recent visit to our hospital was on August 5, 2022. No recurrence of VH was observed. Fluorescein angiography (FA) images showed normal retinal circulation (shown in Fig. 3a). In addition, a hypofluorescent lesion was observed on the optic disc consistent with a RAM lesion (shown in Fig. 3b). OCT images showed a decrease in the RAM on the disc (shown in Fig. 3c) and decimal BCVA was stable at 1.2 in the right eye.

Discussion/Conclusion

We report a rare case of acute onset of dense VH secondary to a ruptured RAM on the optic disc. To the best of our knowledge, this is the first report of acute onset of dense VH associated with RAM development on the optic disc within a few months.

This case showed acute onset of dense VH associated with RAM on the optic disc. The patient had undergone PPV including posterior vitreous detachment from the optic disc and dissection of the vitreous to the periphery. This second surgery for dense VH revealed little residual posterior vitreous cortex on the retinal surface and optic disc. Considering this, traction of residual posterior vitreous cortex to the RAM on the optic disc was unlikely to be the cause of the ruptured RAM on the optic disc. Lavin et al. [2] reported that hemorrhagic RAMs were significantly closer to the optic disc than did other RAMs. Since arteries close to the optic disc have larger diameters and greater flow rates than do peripheral vessels, they suggested that these factors could predispose the arteries to experience increased transmural stress, thereby leading to a hemorrhage. Thus, a RAM on the optic disc can enlarge and cause VH. However, this patient had no history of hypertension or

Fig. 3. Postoperative findings of the right eye. **a** Intravenous FA 1 month after surgery. The FA image shows normal retinal circulation. **b** Magnified image of (a) centered on the optic disc. A hypofluorescent lesion representing thrombosed RAM on the optic disc is visible (arrow). **c** Vertical OCT image across the RAM 1 month after surgery. The OCT image shows a shrunken RAM. FA, fluorescein angiography; OCT, optical coherence tomography; RAM, retinal arterial macroaneurysm.



vascular diseases. We consider that transient hypertension might have been the trigger of rupture of the RAM on the optic disc. However, the exact mechanism of this remains unclear.

We performed PPV for dense VH. As previously reported [1], our patient also experienced visual acuity recovery. Treatment of RAMs is only required in symptomatic and complicated cases. Although some cases reported that laser photocoagulation for RAM on the optic disc was effective in symptomatic cases [11, 13], the risk of visual field loss by this method should not be neglected. In this case, we did not observe any pulsation of the RAM or blood oozing from it intraoperatively, and the macula was intact. Therefore, we decided to closely follow-up the case without any treatment of the RAM. One month after surgery, no recurrence of VH was observed and OCT images illustrated gradual shrinking of the RAM on the optic disc. However, careful long-term follow-up is needed to warrant that recurrence of VH does not occur.

RAMs on the optic disc generally disappear without any intervention [6, 14, 15]. Although recurrent VH was not observed in this case, cases receiving oral anticoagulants should be monitored for the possibility of recurrence [6, 11].

In this case, FA image 1 month after surgery showed normal retinal circulation. Ruptured RAM on the optic disc in approximately 25% of patients could cause BRAO [4, 7, 11]. Therefore, we need to have longer follow-up to determine whether BRAO will develop in the future.

This case report has a major limitation as it is just one case suggesting the possibility that RAM development on the optic disc could cause VH early after its onset. In conclusion, although RAM on the optic disc is rare, it can cause dense VH early after its onset.

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Statement of Ethics

The Ethics Committee of Shinseikai Toyama Hospital waived the need for approval of this study that involved a retrospective review of medical records. This report adhered to the tenets of the Declaration of Helsinki 1964. Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Hirofumi Sasajima, Akari Aoyagi, and Takafumi Suzuki collected the clinical data. Hirofumi Sasajima, Masahiro Zako, and Yoshiki Ueta analyzed the findings and provided critical suggestions. Hirofumi Sasajima contributed to the original draft preparation. Masahiro Zako reviewed and edited the manuscript. Hirofumi Sasajima, Masahiro Zako, Akari Aoyagi, Yoshiki Ueta, and Takafumi Suzuki agree to be accountable for all aspects of work. Hirofumi Sasajima, Masahiro Zako, Akari Aoyagi, Yoshiki Ueta, and Takafumi Suzuki approve the final version of the manuscript for publication.

Data Availability Statement

All data analyzed in this study are included in this article. Further inquiries can be directed to the corresponding author.

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