American Journal of Ophthalmology Case Reports 38 (2025) 102339

Contents lists available at ScienceDirect

American Journal of Ophthalmology Case Reports

journal homepage: www.ajocasereports.com/

Spontaneous repositioning of a dislocated autologous scleral plug after vitrectomy with autologous scleral plug for optic disc pit maculopathy: A case report

Yong Koo Kang [a,b], Seonyong Jeong [c], Dong Ho Park [a,b,d,e], Jae Rock Do [a,b,*]

[a] Department of Ophthalmology, School of Medicine, Kyungpook National University, Daegu, Republic of Korea
[b] Department of Ophthalmology, Kyungpook National University Hospital, Daegu, Republic of Korea
[c] Department of Ophthalmology, Yeungnam University College of Medicine, South Korea
[d] Kyungpook National University Cell & Matrix Research Institute, Daegu, Republic of Korea
[e] BK21 FOUR KNU Convergence Educational Program of Biomedical Sciences for Creative Future Talents, Daegu, Republic of Korea

ARTICLE INFO

Keywords:
Autologous scleral plug implantation
Macular edema
Optic disc pit
Optic disc pit maculopathy
Vitrectomy

ABSTRACT

Purpose: Presented herein is a case of optic disc pit maculopathy (ODP-M) treated with vitrectomy and autologous scleral plug implantation, complicated by scleral plug dislocation. The dislocation was subsequently corrected by spontaneous repositioning without surgical intervention.

Observations: A 58-year-old female was diagnosed with ODP-M and underwent vitrectomy with internal limiting membrane peeling and autologous scleral plug implantation. Postoperatively, the scleral plug successfully sealed the ODP. There was an improvement in visual acuity and a decrease in subretinal fluid (SRF) and cystoid macular edema (CME). Seven weeks after surgery, dislocation of the scleral plug was observed, which was associated with frequent upside-down positioning using an inverting table. The patient was instructed to maintain a supine position, which resulted in spontaneous repositioning of the scleral plug. The scleral plug remained stable over 10 months postoperatively, with continued resolution of CME and SRF. Visual acuity improved to 20/25.

Conclusions and importance: Upside-down positioning may lead to scleral plug dislocation following autologous scleral plug implantation for ODP-M and should be avoided. However, in cases of dislocation, maintaining a supine position may facilitate spontaneous repositioning, potentially eliminating the need for additional surgery. This case underscores the importance of patient education regarding postoperative positioning and demonstrates the potential effectiveness of positional management for scleral plug dislocation.

1. Introduction

Optic disc pit (ODP) is a congenital anomaly characterized by a small, oval excavation in the optic nerve head, with an estimated prevalence of 1 in 11,000.[1] Macular changes including accumulation of serous retinal fluid (SRF) and the development of cystoid macular edema (CME), collectively termed as optic disc pit maculopathy (ODP-M), occurs in 25 %–75 % of ODP cases.[2,3]

Although many patients with ODP-M maintain good long-term visual acuity and resolution of SRF without surgical intervention,[4] treatment is required when SRF and CME worsen, leading to vision deterioration. Treatment options include juxtapapillary laser photocoagulation,[5,6] vitrectomy with peeling of the internal limiting membrane (ILM),[7–9] and autologous scleral plug implantation.[9–12]

Herein, we report a case of a patient with ODP-M treated with vitrectomy and autologous scleral plug implantation, which reduced SRF and CME. However, scleral plug dislocation occurred, but spontaneous repositioning was achieved without surgical intervention.

2. Case report

A 58-year-old female patient presented with best-corrected visual acuity (BCVA) of 20/100 in her right eye. Examination of the fundus revealed an ODP cavity located at the inferotemporal outer border of the optic nerve. Optical coherence tomography (OCT) demonstrated CME and SRF. Initial management included juxtapapillary laser

* Corresponding author. Department of Ophthalmology, School of Medicine, Kyungpook National University, Kyungpook National University Hospital, 130 Dongdeok-ro, Jung-gu, Daegu, 41944, South Korea.
E-mail address: doojr7@gmail.com (J.R. Do).

https://doi.org/10.1016/j.ajoc.2025.102339
Received 9 January 2025; Received in revised form 11 April 2025; Accepted 13 April 2025
Available online 16 April 2025

photocoagulation, which worsened SRF and CME (Fig. 1). Therefore, the patient underwent pars plana vitrectomy, ILM peeling, and autologous scleral plug implantation. The surgical technique was as follows. Core vitrectomy was performed under general anesthesia. After staining the vitreous with triamcinolone acetate, the posterior vitreous detachment induction was achieved. The ILM was stained with 0.005 % indocyanine green dye and peeled circumferentially, including the area of the CME. The tissues of the superior conjunctiva and tenon were incised, exposing the sclera. A 1 × 1 mm half-thickness scleral flap was then created. The scleral flap was trimmed to an approximately 1 × 0.5 mm scleral plug, which was placed into the vitreous cavity and positioned into the ODP using retinal forceps. Fluid-air exchange was performed, followed by 14 % perfluoropropane (C_3F_8) gas tamponade. The patient was instructed to maintain a prone position for three days. One month postoperatively, the BCVA improved to 20/50, and the scleral plug successfully sealed the ODP. OCT showed a reduction in SRF and CME (Fig. 2). Three weeks after the last visit, the patient presented with floaters and decreased vision. Examination of the fundus revealed a dislocated scleral plug in the vitreous, along with a progression of SRF and CME (Fig. 3). The patient reported frequent use of an inverting table for upside-down positioning and noted the onset of floaters after assuming this position. The patient was instructed to maintain a supine position for one week. After one week, the scleral plug was spontaneously repositioned, successfully sealing the ODP (Fig. 4). At 10 months postoperatively, the scleral plug remained stable, effectively sealing the ODP (Fig. 5). OCT showed continued reduction of SRF and CME, and the BCVA improved to 20/25.

3. Discussion

The exact etiology of ODP-M remains uncertain, but several mechanisms have been proposed. Ohno-Matsui et al.[13] suggest that the ODP directly connects the subarachnoid and subretinal spaces, allowing cerebrospinal fluid to flow into the subretinal space, resulting in SRF and CME. Theodossiadis et al.[14] proposed that vitreous traction on the ODP and macula generates negative pressure, enabling vitreous fluid to pass through the pit into the subretinal space.

Based on these proposed mechanisms, vitrectomy with ILM peeling has been performed to eliminate vitreous traction, with reported success rates of 70 %–85.7 %.[7–9] Additionally, autologous scleral plug implantation has been employed to block the connection between the subarachnoid and subretinal spaces, achieving success rates of 83.3 %–100 %.[9–12]

Although autologous scleral plugs are considered effective and generally achieve stable closure of the optic disc pit, there remains a risk of dislocation. In a previous study involving 53 eyes, no cases of plug dislocation were reported,[15] suggesting that such events are exceedingly rare. Nevertheless, clinicians should be aware of the potential for instability, particularly in cases of poor postoperative compliance or unfavorable positioning.

Although the inverted ILM flap technique has shown favorable outcomes in ODP-M, it was not feasible in our case due to intraoperative separation of the ILM during ILM peeling around the optic disc. Therefore, an autologous scleral plug was used as an alternative, which has demonstrated comparable anatomical success in previous reports.[9–12]

In the present case, the scleral plug effectively sealed the ODP postoperatively, resulting in a reduction of SRF and CME. However, 7 weeks postoperatively, the scleral plug was dislocated. Notably, the patient frequently engaged in exercises using an inverting table for upside-down positioning. Since ODP is usually located on the inferotemporal border of the optic nerve head,[16] upside-down positioning may have contributed to the dislocation of the scleral plug from the ODP. This highlights the importance of patient education regarding post-operative positioning and careful monitoring during follow-up.

Another notable finding is that the dislocated scleral plug spontaneously repositioned into the ODP when the patient maintained a supine position, without any surgical intervention. Since the ODP is recessed within the optic disc, it is positioned at the lowest point when in the supine position. This anatomical configuration may facilitate the spontaneous repositioning of the scleral plug into the ODP.

A limitation of this report is the absence of visual field testing, which would have provided additional information regarding possible visual field defects related to the optic disc pit and the scleral plug, although the patient did not report any visual field disturbances.

4. Conclusions

In case of ODP-M treated with vitrectomy and autologous scleral plug implantation, upside-down positioning may lead to scleral plug dislocation and should be avoided. However, if dislocation occurs, spontaneous repositioning of the scleral plug may be achieved in a supine position and should be considered before surgical intervention.

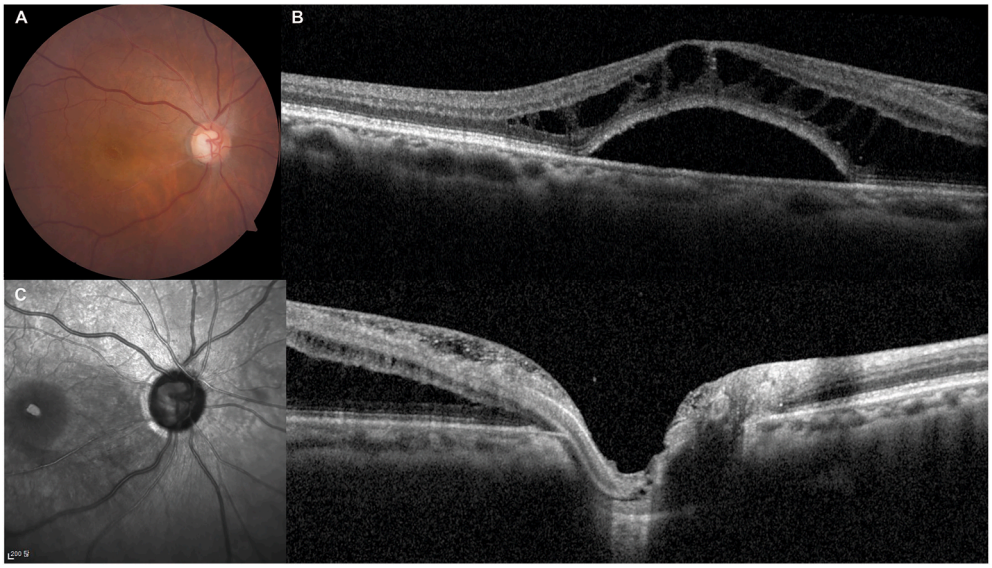

Fig. 1. Photograph of the fundus and optical coherence tomography (OCT) findings at baseline. (A) Examination of the fundus showed an optic disc pit located at the inferotemporal outer border of the optic nerve. (B) OCT image demonstrates subretinal fluid (SRF) and cystoid macular edema (CME), (C) consistent with communication between the perineural and intraretinal space.

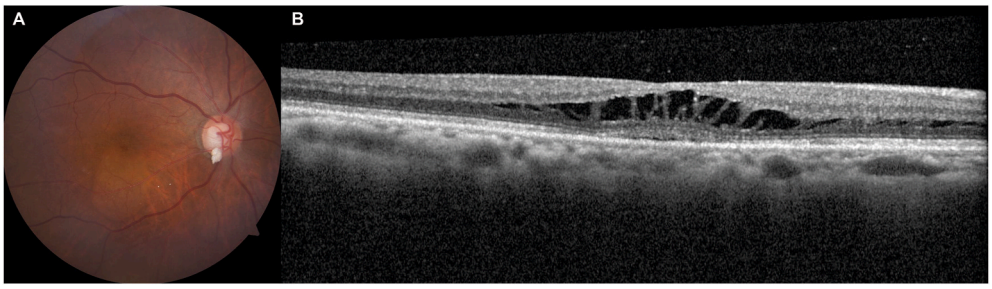

Fig. 2. Photograph of the fundus and optical coherence tomography (OCT) findings at 1 month postoperatively. (A) Examination of the fundus showed an autologous scleral plug sealing the optic disc pit. (B) OCT image illustrates a significant reduction in subretinal fluid (SRF) and cystoid macular edema (CME).

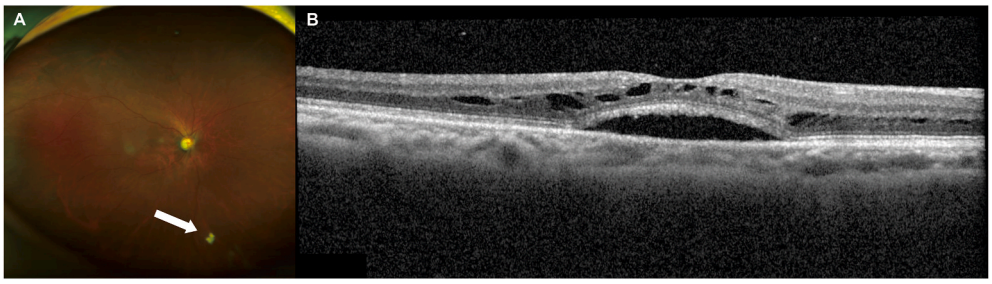

Fig. 3. Wide-field imaging of the fundus and optical coherence tomography (OCT) findings at 7 weeks postoperatively. (A) Examination of the fundus revealed a dislocated scleral plug within the vitreous cavity (white arrow). (B) OCT image demonstrates recurrence of subretinal fluid (SRF) and cystoid macular edema (CME).

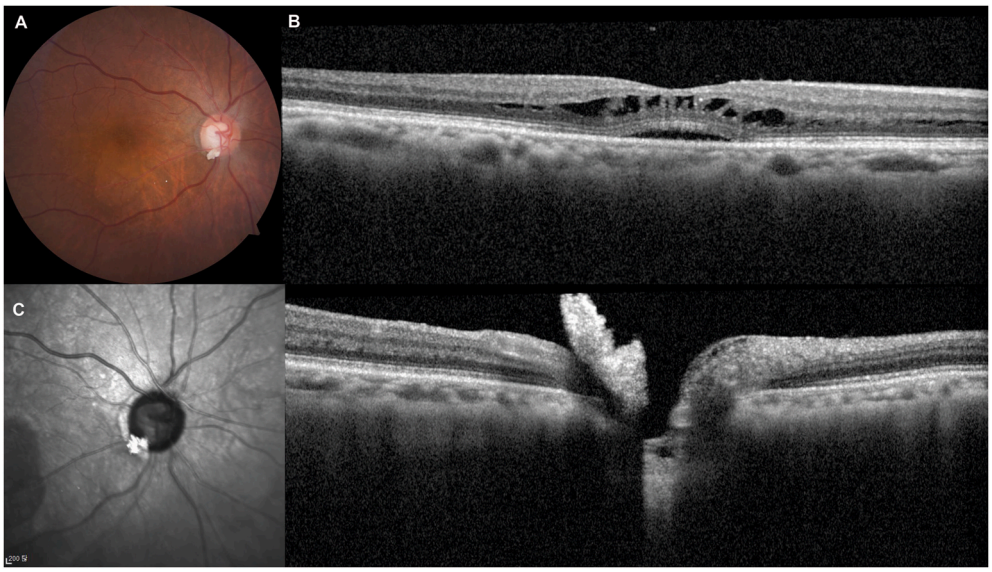

Fig. 4. Photograph of the fundus and optical coherence tomography (OCT) findings 1 week after adopting a supine position. (A) Examination of the fundus showed successful repositioning of the scleral plug into the optic disc pit. (B) OCT image confirms reduction in the subretinal fluid (SRF) and cystoid macular edema (CME), and (C) the scleral plug was located at the optic disc pit.

CRediT authorship contribution statement

Yong Koo Kang: Writing – review & editing, Writing – original draft. **Seonyong Jeong:** Writing – review & editing. **Dong Ho Park:** Writing – review & editing. **Jae Rock Do:** Writing – review & editing, Conceptualization.

Patient consent

The participant signed a written consent form.

Authorship

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

Ethics approval

The study protocol was approved by the Ethics Committee of the Kyungpook National University and was conducted in accordance with the ethical principles of the Declaration of Helsinki.

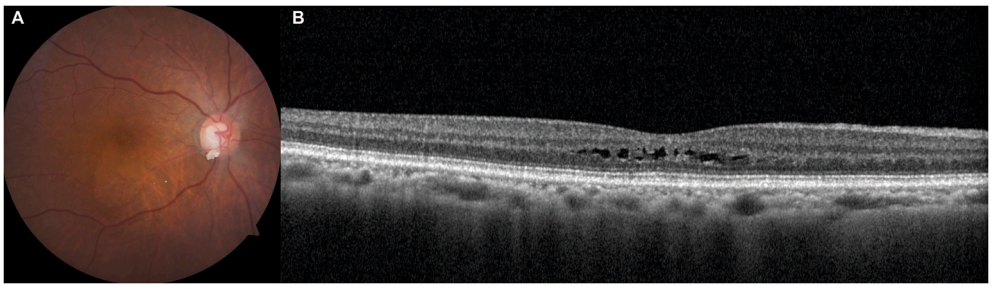

Fig. 5. Photograph of the fundus and optical coherence tomography (OCT) findings at 10 months postoperatively. (A) Examination of the fundus showed stabilization of the scleral plug within the optic disc pit. (B) OCT image demonstrates continued reduction of subretinal fluid (SRF) and cystoid macular edema (CME).

Data availability statement

The original contributions presented in the study are included in the article/Supplementary Material. The datasets analyzed during this study are available from the corresponding author on reasonable request.

Funding

DHP is financially supported by the Basic Science Research Program of the National Research Foundation of Korea (NRF), funded by the Ministry of Science and ICT (MSIT) (RS-2024-00334982); the Information Technology Research Center (ITRC) support program funded by MSIT and supervised by the Institute of Information and Communications Technology Planning & Evaluation (IITP) (IITP-2025-2020-0-01808); the Korea Health Technology R&D Project through the Korea Health Industry Development Institute (KHIDI), funded by the MOHW (HR22C1832, RS-2024-00437643); and the BK21 FOUR KNU Convergence Educational Program of Biomedical Sciences for Creative Future Talents.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

None.

Glossary

BCVA	best-corrected visual acuity
CME	cystoid macular edema
ILM	internal limiting membrane
ODP	optic disc pit
ODP-M	optic disc pit maculopathy
OCT	optical coherence tomography
SRF	subretinal fluid

References

1. Kranenburg EW. Crater-like holes in the optic disc and central serous retinopathy. *Arch Ophthalmol*. 1960;64(6):912–924.
2. Brown GC, Shields JA, Goldberg RE. Congenital pits of the optic nerve head: II. Clinical studies in humans. *Ophthalmology*. 1980;87(1):51–65.
3. Sugar HS. Congenital pits in the optic disc: and their equivalents (congenital colobomas and colobomalike excavations) associated by submacular fluid. *Am J Ophthalmol*. 1967;63(2):298–307.
4. Bloch E, Georgiadis O, Lukic M, da Cruz L. Optic disc pit maculopathy: new perspectives on the natural history. *Am J Ophthalmol*. Nov 2019;207:159–169. https://doi.org/10.1016/j.ajo.2019.05.010.
5. Gass JDM. Serous detachment of the macula: secondary to congenital pit of the optic nervehead. *Am J Ophthalmol*. 1969;67(6):821–841.
6. Theodossiadis G, Panopoulos M, Kollia A, Georgopoulos G. Long-term study of patients with congenital pit of the optic nerve and persistent macular detachment. *Acta Ophthalmol*. 1992;70(4):495–505.
7. Rizzo S, Belting C, Genovesi-Ebert F, et al. Optic disc pit maculopathy: the value of small-gauge vitrectomy, peeling, laser treatment, and gas tamponade. *Eur J Ophthalmol*. 2012;22(4):620–625.
8. Dhananjay S. Double flaps of internal limiting membrane for chronic optic pit maculopathy with large outer lamellar hole. *Indian J Ophthalmol-Case Rep*. 2024;4(2):487–489.
9. Khaqan HA, Naz R, ur Rehman HA, et al. Outcomes of different surgical procedures for optic disc pit: a meta-analysis. *J Egyptian Ophthalmol Soc*. 2024;117(2):100–107.
10. Khatri A, Shrestha SM, Prasai G, et al. Minimally invasive procedure for optic disc pit maculopathy: vitrectomy with scleral plug and analysis on pattern of resolution. *Sci Rep*. 2023;13(1), 15724.
11. Travassos AS, Regadas I, Alfaiate M, Silva ED, Proença R, Travassos A. Optic pit: novel surgical management of complicated cases. *Retina*. 2013;33(8):1708–1714.
12. Esmaeil A, Ali A, Almutairi S, Alkandari K, Behbehani R, Alali A. Congenital optic disc pits and optic disc pit maculopathy: a review. *Front Ophthalmol (Lausanne)*. 2023;3, 1222979. https://doi.org/10.3389/fopht.2023.1222979.
13. Ohno-Matsui K, Hirakata A, Inoue M, Akiba M, Ishibashi T. Evaluation of congenital optic disc pits and optic disc colobomas by swept-source optical coherence tomography. *Investig Ophthalmol Vis Sci*. 2013;54(12):7769–7778.
14. Theodossiadis PG, Grigoropoulos VG, Emfietzoglou J, Theodossiadis GP. Vitreous findings in optic disc pit maculopathy based on optical coherence tomography. *Graefes Arch Clin Exp Ophthalmol*. 2007;245:1311–1318.
15. Kannan NB, Sarkar AD, Vallinayagam M, Jena S, Shah S, Ramasamy K. Anatomical and functional outcome of surgical correction of optic disc pit maculopathy using autologous scleral patch graft: a long-term retrospective analysis. *BMC Ophthalmol*. 2024;24(1):1–9.
16. Tzu JH, Flynn Jr HW, Berrocal AM, Smiddy WE, Murray TG, Fisher YL. Clinical manifestations of optic pit maculopathy as demonstrated by spectral domain optical coherence tomography. *Clin Ophthalmol*. 2013:167–172.