Annals of Clinical and Medical Case Reports

Case Report ISSN 2639-8109 Volume 6

Acute Macular Pucker After Silicone Oil Removal After Reattachment Surgery for Giant Retinal Tear Detachment

Chen H* and Tsai Y

[1]Department of Ophthalmology, Mackay Memorial Hospital, Hsinchu, Taiwan

***Corresponding author:**
Hsi-Fu Chen,
Department of Ophthalmology, Mackay Memorial Hospital, Hsinchu, Taiwan, Tel: +886-935665660, Fax: +886-3-6110900,
E-mail: aurora6th@yahoo.com.tw

Received: 11 Mar 2021
Accepted: 27 Mar 2021
Published: 01 Apr 2021

Keywords:
Acute macular pucker; Silicone oil removal; Giant retinal tear detachment; Optical coherence tomography; Proliferative vitreoretinopathy

Authors' Contributions:
Chen H and Tsai Y. these authors are contributed equally to this article

Citation:
Chen H. Acute Macular Pucker After Silicone Oil Removal After Reattachment Surgery for Giant Retinal Tear Detachment. Ann Clin Med Case Rep. 2021; V6(10): 1-4.

1. Abstract

Acute macular pucker is an uncommon entity of epiretinal membrane due to proliferative vitreoretinopathy, and typically presents with rapid progression of vision loss and metamorphopsia over 2 weeks to 3 months after retinal tears or detachment. We report an atypical case of acute macular pucker after silicone oil removal after reattachment surgery for giant retinal tear detachment in the left eye of a 49-year-old man. He underwent phacovitrectomy with macular epiretinal membrane peeling for rapid deteriorated visual acuity from 6/30 to 6/200 within 2 weeks of diagnosis, and his final visual acuity improved to 12/20. This case report highlights the importance of early recognition and prompt surgical treatment at an evolutive stage of acute macular pucker, and demonstrates the unusual presentation of acute macular pucker with rapid progression of extensive fingerlike projections disrupting the macular architecture on sequential spectral domain optical coherence topography.

2. Introduction

Acute macular pucker (MP) has been described as an uncommon entity of epiretinal membrane (ERM) due to proliferative vitreoretinopathy (PVR), and typically presents with acute onset of precipitous visual loss and metamorphopsia over 2 weeks to 3 months, secondary to macular pucker after retinal tears or detachment [1]. Herein, we report an atypical case of acute MP after silicone oil (SO) removal after reattachment surgery for giant retinal tear (GRT) detachment, documented with sequential spectral domain optical coherence topography (SDOCT).

3. Case Presentation

A 49 year-old man presented with sudden blurred vision in his left eye, when multiple retinal breaks and vitreous hemorrhage were observed. He was initially treated with laser retinopexy, but he returned with a best-corrected visual acuity (BCVA) of 6/60 and a superior macula-off GRT detachment in his left eye (Figure 1A). He underwent 25-gauge pars plana vitrectomy combined with encircling scleral buckle, intraoperative usage of perfluorocarbon liquids, 360° endolaser retinopexy, and a 5000-centistoke SO tamponade, with no intraoperative internal limiting membrane (ILM) peeling. After fluid–air exchange, mild iatrogenic intraocular hemorrhage was caused by maneuvers to reposition the posteriorly slipped GRT, accompanied by subretinal hemorrhage involving the dependent part of retinal detachment close to the macula. Under SO tamponade for 14 weeks, his left BCVA improved to 6/30 with a stable attached retina, resolution of subretinal hemorrhage, and restoration of normal macular architecture (Figure 1B). To treat the emulsified SO droplets in the anterior chamber, he had undergone uncomplicated pars plana vitrectomy for SO removal using a 25-gauge Alcon Constellation three-port system. Four weeks after SO removal, the patient returned with a

1 week history of metamorphopsia, and the BCVA was reduced to 6/120 in the left eye. Fundoscopy revealed an unexpected dense macular ERM, secondary to a prominent MP on SDOCT (Figure 2A). Within 2 weeks after diagnosis, he underwent phacovitrectomy with macular ERM peeling in his left eye for rapid progression of metamorphopsia, BCVA from 6/30 to 6/200, and anatomic disruption of the central macula on SDOCT (Figure 2B). Four weeks after ERM removal, his left BCVA recovered to 6/20. The BCVA improved to 6/12 by 3 months postoperatively. At the time of the 2 year follow-up assessment, his final BCVA improved to 12/20 with resolution of metamorphopsia and restoration of otherwise normal macular architecture on SDOCT (Figure 3).

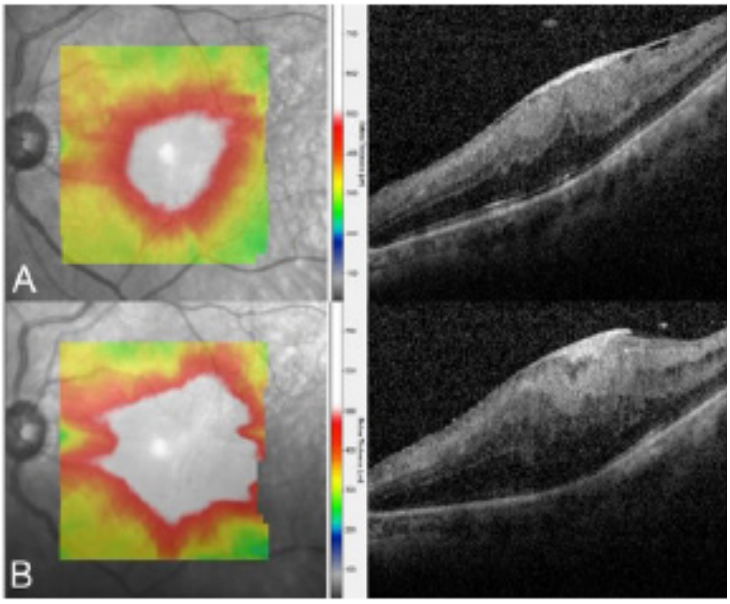

Figure 2: (A) Spectral domain optical coherence topography in the left eye revealed an unexpected macular pucker 4 weeks after silicone oil removal. (B) Spectral domain optical coherence topography in the left eye demonstrated a rapidly progressive macular pucker with extensive fingerlike projections disrupting the central macula 1 week after diagnosis.

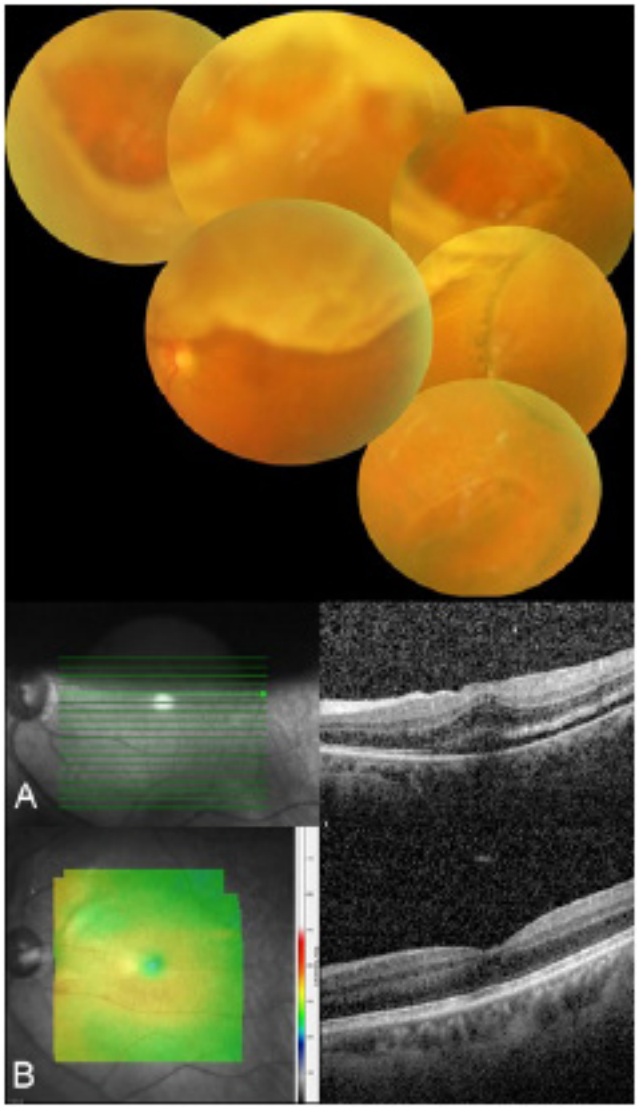

Figure 1: (A) At presentation, mosaic fundus photography and spectral domain optical coherence topography in the left eye revealed a macula-off, superior giant retinal tear detachment. (B) Spectral domain optical coherence topography in the left eye demonstrated no macular pucker formation 3 months after reattachment surgery.

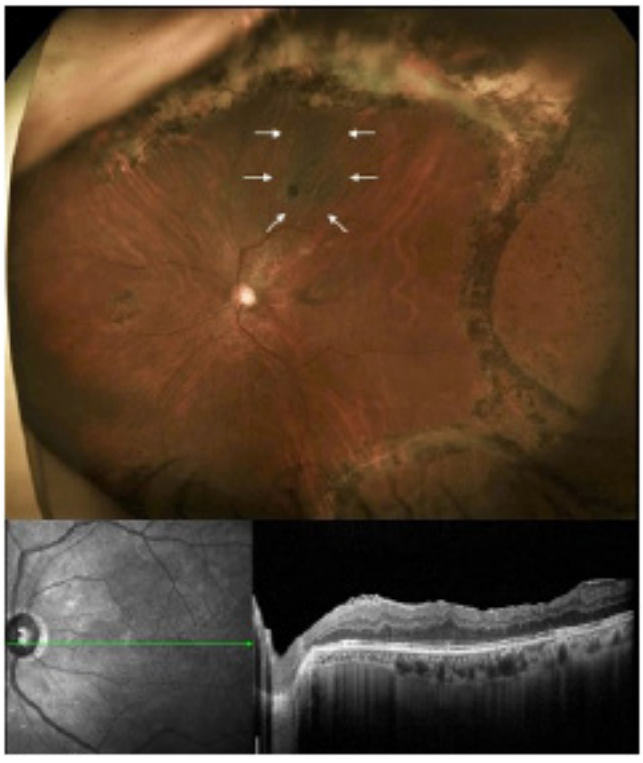

Figure 3: At the 2 year follow-up evaluation, ultra-widefield fundus photography in the left eye showed reattachment of the retina and a descending gravitational tract with pigmentary changes after resolution of previous iatrogenic subretinal hemorrhage (white arrows), and spectral domain optical coherence topography showed an absence of macular pucker.

4. Discussion

We report a case of macula-off GRT detachment with multiple retinal breaks, vitreous hemorrhage, no ILM peeling, and mild iatrogenic intraocular hemorrhage when repositioning the GRT. After reattachment surgery with SO tamponade for 14 weeks, this case presented with acute MP 4 weeks after SO removal. Phacovitrectomy with macular ERM peeling was performed within 2 weeks of diagnosis. Early recognition and prompt surgical treatment at an evolutive stage of acute MP results in rapid recovery of vision and resolution of metamorphopsia.

In this case, we demonstrate a rapidly progressive MP disrupting retinal layers of the central macula on sequential SDOCT, corresponding to a dense macular ERM causing radiating retinal folds on fundoscopy, consistent with a limited form of PVR, classified as type 1 PVR (grade CP-1) according to the updated Retina Society Classification.[2] The pathogenesis of PVR involving the macula after retinal tears or detachment has been advocated as an aberrant wound healing response, which is triggered by inflammation and the breakdown of the blood–retinal barrier (BRB), leading to formation of scar-like fibrous macular ERM [1,3,4,]. Both of the two preconditions of PVR, inflammation and dispersed responsive cells, must be present at the same time, allowing PVR to develop. Apart from this, the rationale of using SO as an intraocular tamponade can not only lower the aqueous shear stress on the retina induced by ocular movements but also interrupt the open communication between the subretinal space and RPE cells and the preretinal space and vitreous cavity [5], thus securing the retinal reattachment and containing cellular dispersion within the vitreous cavity.

Many significant risk factors have reportedly been associated with the development of postoperative MP after a contemporary 23- or 25-gauge microinvasive vitrectomy without SO tamponade or scleral buckling for rhegmatogenous retinal detachment (RRD), including multiple or large retinal breaks, preoperative or postoperative vitreous hemorrhage, no ILM peeling, and macula-off RRD [6-8]. We are able to identify all of the above mentioned preoperative and intraoperative risk factors in this case. Moreover, several significant risk factors for the development of postoperative PVR also occurred simultaneously in this case, such as a GRT, multiple retinal breaks with a cumulative break area larger than three optic disks, and minor iatrogenic intraocular hemorrhage [9]. Thus, our patient posed a heightened risk of developing not only MP but also PVR, which would have likely developed regardless of whether there was SO in the eye.

PVR is the most common cause of surgical failure in the treatment of RRD. As many as 14% of eyes with GRT detachments develop retinal redetachment after SO removal. Postoperative PVR has been reported to be the major cause of retinal redetachment [10], indicating that SO removal is associated with the onset of postoperative PVR. Furthermore, Tan et al found that there was a significantly higher redetachment rate in RRD cases with a short SO tamponade duration of less than 2 months [11]. However, other studies, with a minimum SO tamponade duration ranging from 2.6 to 6 months, have concluded that the rate of redetachment after SO removal was independent of SO tamponade duration [12-14]. In other words, these results indicate that a SO tamponade duration of at least 2.6 months does not predispose to postoperative PVR. In this case, because the SO was removed with a tamponade duration of 14 weeks (3.5 months), we consider SO removal to be a precipitating factor for the onset of acute MP rather than having a significant causative impact on it.

A preceding history of mild iatrogenic intraocular hemorrhage involving the dependent part of macula-off detachment when repositioning the superior GRT may have been an important predisposing factor for the development of acute MP after SO removal in this case. This can be explained by the fact that a surgically induced breakdown of the BRB due to iatrogenic problems is accompanied by an influx of serum inflammatory mediators and blood-borne responsive cells within the vitreous cavity and on the macular surface, causing a PVR stimulating environment, thereby initiating the responses of PVR involving the macula [9,15]. Furthermore, Mietz et al found that the median duration between retinal disease and primary PVR was 2 months (range, 0.5–45 months), with 79% of cases developing within the first 3 months and 90% within the first 6 months [16]. In addition, Sheard et al found that 4 of 5 (80%) of acute MP occurred within 5 months of the retinal disease [1]. These suggest that the retinal situation may not have been settled when the SO was removed with a tamponade duration of 3.5 months in this case. Altogether, we hypothesize that acute MP may result from an unsettled surgically induced breakdown of BRB in the absence of SO to contain inflammatory factors and cellular dispersion within the vitreous cavity and on the macular surface. Therefore, we suggest that not only meticulous care should be taken when repositioning the GRT to avoid iatrogenic intraocular hemorrhage involving the dependent part of the detachment, but also SO may need to be retained for extended duration in such cases until the responses of PVR are settled, to prevent acute MP after SO removal.

Moreover, when managing patients presenting with GRT detachments and multiple risk factors for MP and PVR development, such as macula-off RRD, multiple retinal breaks, and vitreous hemorrhage as in this case, prophylactic ILM peeling may be considered to prevent the formation of MP.

This study has several limitations. This is a single case report that it is difficult to conclude that a longer SO tamponade duration will help prevent acute MP after SO removal in such cases. Further studies of a larger number of cases are necessary.

In summary, we report an atypical case of acute MP after SO re-

moval after reattachment surgery for GRT detachment. This case highlights the importance of early recognition and prompt surgical treatment at an evolutive stage of acute MP, and demonstrates the unusual presentation of acute MP with rapid progression of extensive fingerlike projections disrupting the macular architecture on sequential SDOCT.

References

1. Sheard RM, Sethi C, Gregor Z. Acute macular pucker. Ophthalmology. 2003; 110(6): 1178-84.
2. Machemer R, Aaberg TM, Freeman HM, Irvine AR, Lean JS, Michels RM. An updated classification of retinal detachment with proliferative vitreoretinopathy. Am J Ophthalmol. 1991; 112(2): 159-65.
3. Asato R, Yoshida S, Ogura A, Nakama T, Ishikawa K, Nakao S, et al. Comparison of gene expression profile of epiretinal membranes obtained from eyes with proliferative vitreoretinopathy to that of secondary epiretinal membranes. PLoS One. 2013; 8(1): e54191.
4. Harada C, Mitamura Y, Harada T. The role of cytokines and trophic factors in epiretinal membranes: involvement of signal transduction in glial cells. Prog Retin Eye Res. 2006; 25(2): 149-64.
5. Isakova K, Pralits JO, Repetto R, Romano MR. Mechanical models of the dynamics of vitreous substitutes. Biomed Res Int. 2014; 2014: 672926.
6. Heo MS, Kim HW, Lee JE, Lee SJ, Yan IH. The clinical features of macular pucker formation after pars plana vitrectomy for primary rhegmatogenous retinal detachment repair. Korean J Ophthalmol. 2012; 26(5): 355-61.
7. Ishida Y, Iwama Y, Nakashima H, Ikeda T, Emi K. Risk Factors, Onset, and Progression of Epiretinal Membrane after 25-Gauge Pars Plana Vitrectomy for Rhegmatogenous Retinal Detachment. Ophthalmol Retina. 2020; 4(3): 284-8.
8. Sella R, Sternfeld A, Budnik I, Zapata M, García-Arumí J. Epiretinal membrane following pars plana vitrectomy for rhegmatogenous retinal detachment repair. Int J Ophthalmol. 2019; 12(12): 1872-7.
9. Girard P, Mimoun G, Karpouzas I, Montefiore G. Clinical risk factors for proliferative vitreoretinopathy after retinal detachment surgery. Retina. 1994; 14(5): 417-24.
10. Shunmugam M, Ang GS, Lois N. Giant retinal tears. Surv Ophthalmol. 2014; 59(2): 192-216.
11. Tan HS, Dell'omo R, Mura M. Silicone oil removal after rhegmatogenous retinal detachment: comparing techniques. Eye (Lond). 2012; 26(3): 444-7.
12. Jonas JB, Budde WM, Knorr HL. Timing of retinal redetachment after removal of intraocular silicone oil tamponade. Am J Ophthalmol. 1999; 128(5): 628-31.
13. Jonas JB, Knorr HL, Rank RM, Budde WM. Retinal redetachment after removal of intraocular silicone oil tamponade. Br J Ophthalmol. 2001;85(10):1203-7.
14. Lam RF, Cheung BT, Yuen CY, Wong D, Lam DSC, Lai WW. Retinal redetachment after silicone oil removal in proliferative vitreoretinopathy: a prognostic factor analysis. Am J Ophthalmol. 2008; 145(3): 527-33.
15. Pastor JC, de la Rua ER, Martin F. Proliferative vitreoretinopathy: risk factors and pathobiology. Prog Retin Eye Res. 2002; 21(1): 127-44.
16. Mietz H, Heimann K. Onset and recurrence of proliferative vitreoretinopathy in various vitreoretinal disease. Br J Ophthalmol. 1995; 79(10): 874-7.