

Management of fovea-involving dry macular fold complicating retinal detachment surgery: Does delayed intervention influence outcome?

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Retinal folds are rare complications of rhegmatogenous retinal detachment surgery. They may be located in periphery or involve macula, with the latter ones being associated with severe visual loss. Due to the paucity of scientific reports, its management remains debatable. Most authors advocate an early surgical intervention for symptomatic macular folds (MF). We present 2 cases of symptomatic dry macular fold which were managed successfully after different time intervals. As evidence gets collected that late intervention also leads to good visual outcome, long standing MF should not be considered an absolute contraindication for surgical intervention.

Key words: Early, late, macular fold, Perfluorocarbon liquid, retinal detachment

Retinal fold (RF) is a rare complication of rhegmatogenous retinal detachment (RRD) surgery. They may be located

in periphery or involve macula, with the latter ones being associated with severe visual loss. However, its rare occurrence precludes adequate literature evidence related to its management.^[1,2] We present 2 cases of symptomatic dry macular fold (MF) which were managed successfully after different time intervals.

A 23G trochar-cannula system was used to manage both the eyes. Initially, silicon oil (SO) was removed. Retinal detachment was then intentionally induced with the help of a 41G cannula. Balanced saline solution (BSS) was injected into the subretinal space in all four quadrants, outside arcades using automated viscous fluid injector till all the blebs coalesced together [Fig. 1a]. Perfluorocarbon liquid (PFCL) was then injected over the posterior pole [Fig. 1b] and diamond dusted membrane scraper (DDMS) was used to gently stroke and unfold the MF [Fig. 1c]. Once the fold settled down, internal limiting membrane was stained with brilliant blue G (BBG) dye and peeled from arcade to arcade. A small peripheral retinotomy was made to drain the subretinal fluid (SRF), following which it was lasered. Fluid-air exchange was then done and tamponade was given with 1000cSt SO. The patients were told to maintain a prone position for the next 48 hours.

Case Reports

Case 1


A 53-year-old male was referred to our centre for non-resolving MF. He had undergone vitrectomy with SO tamponade for rhegmatogenous retinal detachment (RRD) caused by giant retinal tear (GRT) 4 months ago. The horizontal RF passed through the fovea, causing a decrease in best-corrected visual acuity to 20/200 [Fig. 2a]. On first post-operative day, clinical examination as well as optical coherence tomography (OCT) showed absence of macular fold [Fig. 2b]. SO was removed after 3 months, following which he gained a BCVA of 20/40.

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Cite this article as: Babu N, Kumar J, Kohli P, Ramteke P. Management of fovea-involving dry macular fold complicating retinal detachment surgery: Does delayed intervention influence outcome? Indian J Ophthalmol 2020;68:1197-9.

Access this article online

Quick Response Code:	Website: www.ijo.in
	DOI: 10.4103/ijo.IJO_1843_19

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Received: 07-Oct-2019

Revision: 23-Dec-2019

Accepted: 04-Jan-2020

Published: 25-May-2020

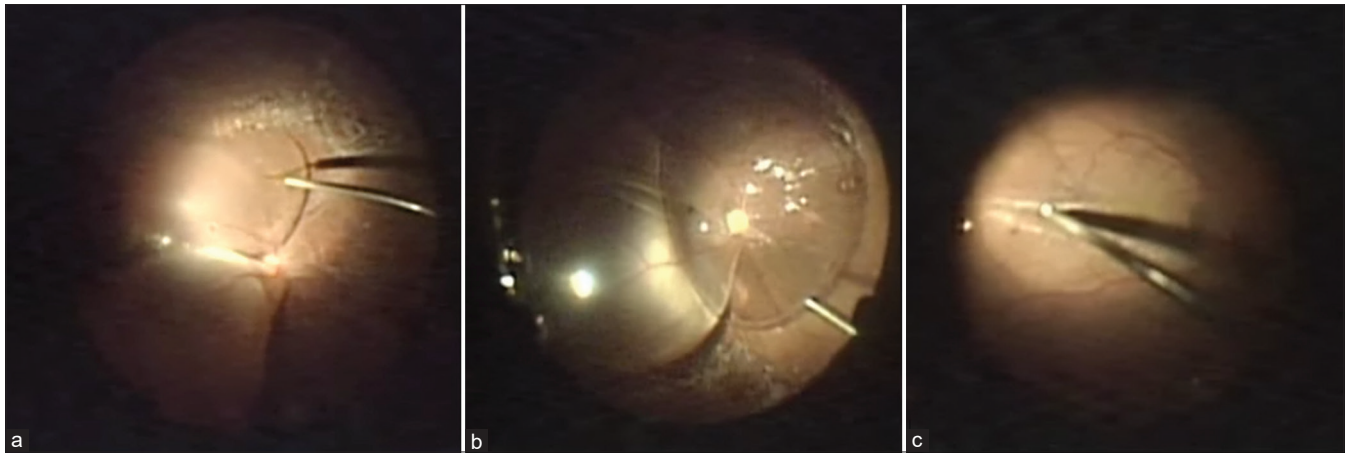


Figure 1: Intra-operative images of the surgical technique followed showing (a) balanced saline solution being injected into the subretinal space, outside the arcades with the help of a 41G cannula to intentionally induce retinal detachment till all the blebs coalesce together, (b) perfluorocarbon liquid being injected over the posterior pole, and (c) diamond dusted membrane scraper being used to gently stroke and unfold the macular fold

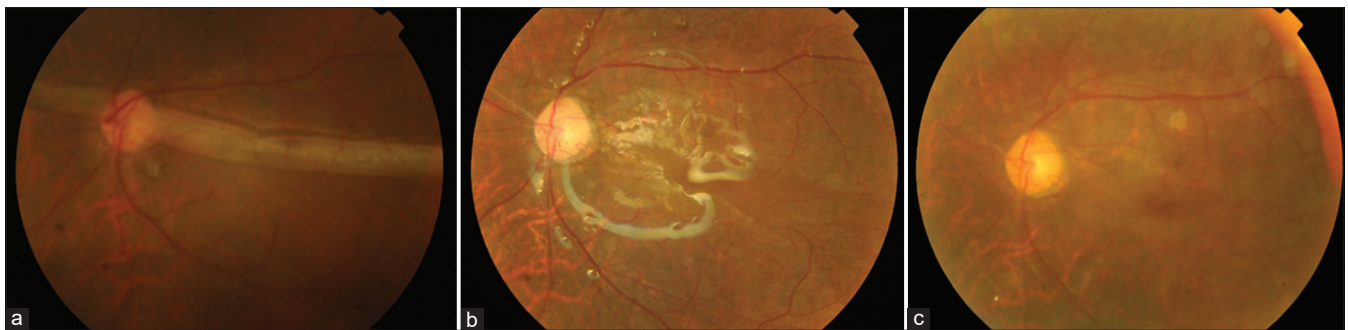


Figure 2: Fundus images of Case number 1 showing (a) pre-operative status with macular fold (MF) passing through the macula, (b) post-operative status with silicon oil in-situ with resolved MF, and (c) status post-silicon oil removal

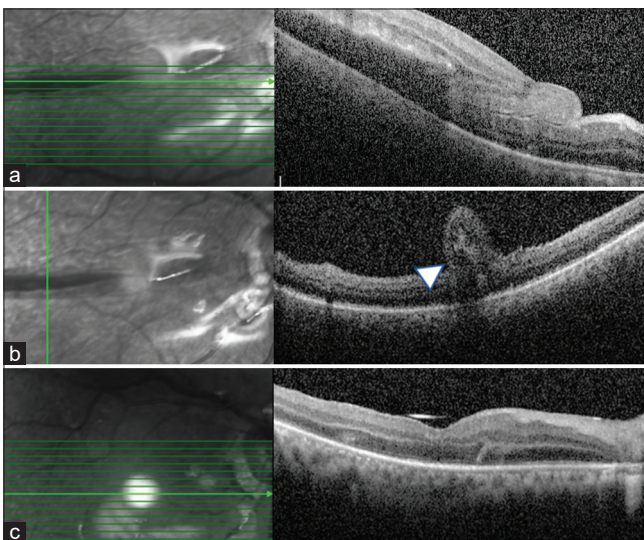


Figure 3: Images of line scan of optical coherence tomography of case number 2 showing (a) pre-operative horizontal scan through the macular fold (MF), (b) pre-operative vertical scan through the MF, and (c) post-operative horizontal scan with silicon oil in-situ showing the resolution of MF

There was no recurrence of retinal detachment or MF even after six years [Fig. 2c].

Case 2

A 36-year-old male underwent vitrectomy with SO tamponade at our centre for macula-off superior RRD. BCVA on post-operative day one was hand movements, while examination showed a MF through the fovea and was confirmed on OCT [Fig. 3a and b]. He underwent MF corrective surgery the next day, following which the MF settled. SO was removed after three months following which he gained a BCVA of 20/80. There was no recurrence of retinal detachment or MF even after two years of follow up [Fig. 3c].

Discussion

First reported by Pavan in 1984, visually significant MF is said to be an underreported complication. The risk factors known to cause these folds include bullous RRD, RRD associated with giant retinal tears, incomplete SRF drainage, and poor compliance to post-operative posturing.^[1] The possible causes of MF formation in the second case could be incomplete SRF drainage and patient's inability to maintain post-operative prone positioning. Due to the paucity of scientific reports, its

management remains debatable. While most authors advocate an early surgical intervention, some have reported spontaneous resolution of such folds.^[1-12]

Surgical management of MF is technically challenging. The surgical technique we followed involves induction of RRD by injecting subretinal BSS. This injection is done outside the vascular arcades to reduce the shear stress on foveal photoreceptors. Pockets of fluid are thus created around the macular area till they coalesce. PFCL helps to iron the central retina, while ILM peeling reduces the retinal stiffness. With increased retinal compliance, DDMS can be used to unfold the MF. Retino-retinal adhesions between the MF were not noted during the surgery in any of the 2 cases. Creating peripheral retinotomy ensures complete SRF drainage and prevent recurrence of MF. A similar technique has been reported by most of the other authors.^[4-11] Similar to the evidence provided by literature, even in our experience a relaxing retinectomy is not required as these folds are not usually associated with retinal shortening.^[1-11]

With the wide diversity of outcomes reported in literature, dilemma surrounds the timing of surgery. Hayashi *et al.* advocated early intervention on the basis of his animal experiments which showed photoreceptors apoptosis and outer nuclear layer thinning as early as one week after limited macular translocation.^[12] On the contrary, other authors have demonstrated that unlike retinal detachment, photoreceptors in MF maintain their proximity to the retinal pigment epithelium and do not get atrophied.^[3]

We present two cases of dry MF which were treated at different time intervals. While one patient underwent secondary surgical intervention after four months, the other underwent surgery the next day. The second patient was taken up for a very early intervention as the patient was unable to maintain prone positioning due to obesity. Both patients had good visual outcome. In fact, the patient who underwent early surgery had a poorer outcome. This could be attributed to amblyopia as he had bilateral congenital cataract for which he underwent cataract extraction at an early age followed by iris-fixated intra-ocular lens implantation at the age of 25 years. Similarly, good visual outcome has been reported by other authors also. While most of the authors performed surgery within one month, Gruener *et al.* reported good visual outcome even after five months.^[4-11] The second surgery may get delayed due to several reasons like patient's lack of consent for a second procedure too soon after the first one; or the surgeon's choice to wait for spontaneous resolution before going for a challenging surgery. However, in our opinion old standing dry MF present since several years will not possibly benefit from surgery due to atrophy of photoreceptors.

Currently it not possible to predict the natural course of dry MF. While some may settle spontaneously, most need surgical intervention.^[1,2] Even though an early surgery is recommended for the treatment of MF, late intervention can also lead to a good visual outcome.

Conclusion

This case report highlights that even long-standing MF should not be considered an absolute contraindication for surgical intervention.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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