

## Postvitrectomy macular hole undergoing delayed closure after 28 months

Rutul Patel, Mahesh Gopalakrishnan, Bindu Rajesh, Anantharaman Giridhar

Case report of a 70-year-old male who developed full thickness macular hole (MH) following vitrectomy for vitreomacular traction syndrome. The further intervention was deferred due to the unwillingness of the patient for the second surgery. Periodic follow up of the patient, revealed improvement in visual acuity with the closure of the MH after 28 months.

**Key words:** Delayed closure, macular hole, vitrectomy, vitreomacular traction

Macular holes (MHs),<sup>[1]</sup> are usually idiopathic in nature with myopia, trauma, and surgery being other secondary etiologies reported. Large full thickness Stage 2–4 MHs rarely undergo spontaneous closure, unlike Stage 1 MH,<sup>[2]</sup> thus necessitating surgical intervention.<sup>[3]</sup>

Among the secondary etiologies for MH, occurrence of MH following vitreoretinal surgeries has also been reported previously.<sup>[4–6]</sup> Lipham and Smiddy in their case series on postvitrectomy MH emphasized factors other than tractional component to be responsible for MH formation.<sup>[4]</sup> Postvitrectomy MHs usually require resurgery in the form of internal limiting membrane (ILM) peeling and gas injection with anatomical closure in 70% of cases.<sup>[5]</sup> Spontaneous closure of such MHs is very rare. It has been reported to occur within 3 weeks postoperatively.<sup>[7]</sup>

Herein, we report unexpected spontaneous closure of a full thickness macular hole (FTMH) 28 months following vitrectomy for vitreomacular traction (VMT).

### Case Report

A 70-year-old male patient was referred to our hospital for decreased vision with distortion of images in the right eye for the past 1 month. There was no history ocular trauma. Best-corrected visual acuity (BCVA) was 20/60 and 20/20 in the right and left eye, respectively, on Snellen's visual

acuity chart. Ocular examination revealed the presence of cataract with the loss of foveal reflex and incomplete posterior vitreous detachment (PVD) in the right eye. Spectral domain optical coherence tomography (SD-OCT-Spectralis-Heidelberg Engineering) of the right eye revealed the presence of VMT [Fig. 1].

He underwent an uneventful phacoemulsification along with intraocular lens implantation and 23 gauge vitrectomy followed by a fluid air exchange. No ILM peeling or gas injection was done during the procedure.

Ten days following the surgical procedure, slit lamp biomicroscopy revealed a large full thickness Stage 4 MH with surrounding intraretinal cysts as confirmed on SD-OCT scans to have a base diameter of 1414  $\mu$ m [Fig. 2]. A decrease in BCVA to counting finger 2 m was noted in the right eye at that time. No intervention was done, and the patient was advised for follow up after six weeks.

As the hole was still persisting, the patient was advised ILM peeling with intraocular gas injection, which the patient refused due to personal reasons. He was followed up regularly at 3, 5, 8, 12, and 18 months following surgery with OCT scans which started showing gradual reduction in the size of the hole after 18 months [Fig. 3].

At 28 months, BCVA showed an improvement to 20/80 in the right eye, and spontaneous closure of the persistent MH was noted on slit lamp biomicroscopy, and SD-OCT revealed restoration of the outer retinal layers as well [Fig. 4].

### Discussion

Incomplete separation of the posterior vitreous with strong residual attachment at the fovea results in the VMT syndrome. Though the spontaneous release of VMT has been described in as high as 47% of eyes with localized vitreous adhesions and absence of epiretinal membranes,<sup>[8]</sup> majority of these eyes need surgical intervention in the form of vitrectomy to relieve the traction.<sup>[9]</sup> Occurrence of FTMH has been reported in the



**Figure 1:** Baseline spectral domain optical coherence tomography showing vitreomacular traction

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**Cite this article as:** Patel R, Gopalakrishnan M, Rajesh B, Giridhar A. Postvitrectomy macular hole undergoing delayed closure after 28 months. Indian J Ophthalmol 2017;65:882-4.

Access this article online	
<b>Quick Response Code:</b>	<b>Website:</b> www.ijournal.in
	<b>DOI:</b> 10.4103/ijournal.IJO_426_17

Department of Vitreo-Retina, Giridhar Eye Institute, Cochin, Kerala, India

**Correspondence to:** Dr. Rutul Patel, Giridhar Eye Institute, Ponneth Temple Road, Kadavanthra, Cochin - 682 020, Kerala, India. E-mail: rutul\_nhl@yahoo.co.in

**Manuscript received:** 25.05.17; **Revision accepted:** 20.07.17

natural history of VMT,<sup>[8]</sup> and also rarely following surgical intervention, i.e., vitrectomy.<sup>[4-7,9]</sup> Several mechanisms have been suggested for the occurrence of an FTMH following vitrectomy which include persistence of traction on fovea by the posterior hyaloid, intraretinal cystoid edema or deroofing of the ILM during vitrectomy.

Despite careful vitrectomy with PVD induction by the use of triamcinolone, the SD-OCT scan in our patient revealed trimmed focal attachments of the posterior hyaloid at the edges of the hole. This traction along with iatrogenic deroofing of the ILM at the fovea could have possibly resulted in the occurrence of the FTMH. The presence of vitreoschisis as noted in the preoperative scan and lack of repeated staining of hyaloid could have possibly been etiological for the hyaloids remnants. Besides as ILM peeling was not done, the tangential traction by the ILM would have resulted in the further widening of the FTMH in the postoperative period. Persistent attachment of posterior hyaloid to the edge of MH can be the reason of nonclosure of MH. After prolonged follow up the spontaneous release of posterior hyaloid resulted in the closure of MH. The process of this spontaneous release of posterior hyaloid is very nicely documented on sequential SD-OCT pictures of our patient on subsequent follow-up visits.

Odrobina *et al.*<sup>[7]</sup> have also demonstrated the spontaneous closure of FTMH following vitrectomy for VMT similar to our patient. They observed the FTMH at 1 week, and its spontaneous closure was observed much earlier (at 3 weeks) than in our patient (28 months). The ILM peeling in their primary procedure would have possibly facilitated earlier closure in their case by promoting glial proliferation.

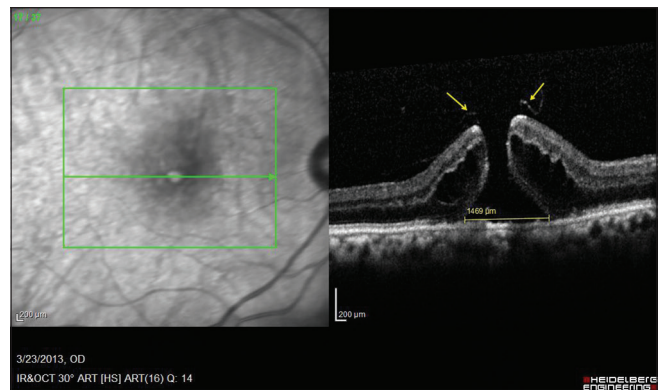
Falkner-Radler *et al.* demonstrated late spontaneous closure of a persistent MH 9 months after unsuccessful MH surgery.<sup>[10]</sup> The base diameter of the FTMH in their patient was smaller (587  $\mu$ ) when compared to our patient (1414  $\mu$ ) and their patient had undergone epiretinal as well as ILM peeling and had no residual membranes.

Spontaneous closure of MH with good restoration of retinal layers and improvement in visual acuity after such a long duration in the setting of persistent hyaloid at the hole edges and without ILM peeling or use of any tamponade highlights the possibility of a delayed natural glial proliferation. However why it takes a long period to occur or what incites it after such a long time still remains unanswered.

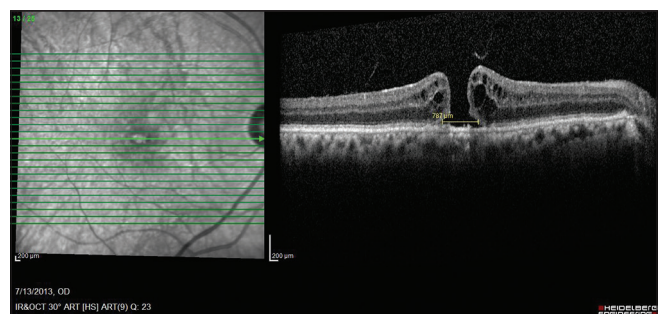
Though a period of observation can be considered to allow for spontaneous closure of FTMH following vitrectomy, our patient apparently had the longest duration (i.e., 28 months) reported so far in literature before spontaneous closure. Despite the long duration, preservation and restoration of the outer retinal layers could explain the significant improvement in visual acuity from counting fingers 2 m to 20/80.

## Conclusion

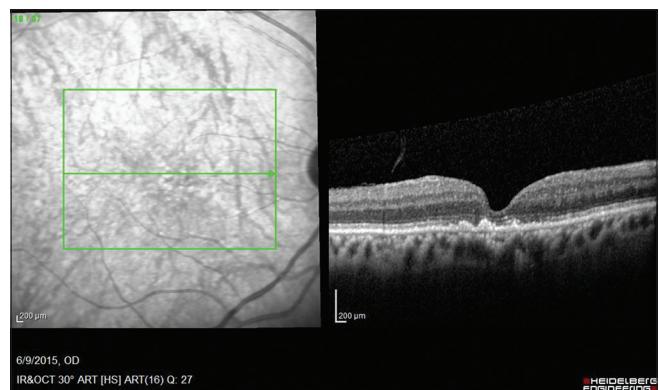
Thus, the occurrence of FTMH following vitrectomy emphasizes the need for careful vitrectomy and adjunctive ILM peeling with or without intraocular gas tamponade in vulnerable eyes could facilitate early closure of the hole if it occurs and wherein second intervention is not possible, we would recommend sequential OCTs as chances of delayed spontaneous hole closure should always be kept in mind.



**Figure 2:** Spectral domain optical coherence tomography after 10 days of surgery showing Stage 4 full thickness macular hole and remnant of posterior hyaloids at edge of macular hole



**Figure 3:** Spectral domain optical coherence tomography after 18 months of surgery posterior hyaloid remnant partially getting released and reduction in macular hole size with outer retinal layers yet not formed and absent external limiting membrane



**Figure 4:** Spectral domain optical coherence tomography after 28 months of surgery showing spontaneous closure of macular hole with well-formed external limiting membrane and regenerating ellipsoid layer

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## References

- Gass JD. Idiopathic senile macular hole. Its early stages and pathogenesis. *Arch Ophthalmol* 1988;106:629-39.
- La Cour M, Friis J. Macular holes: Classification, epidemiology,

- natural history and treatment. *Acta Ophthalmol Scand* 2002;80:579-87.
3. Freeman WR, Azen SP, Kim JW, el-Haig W, Mishell DR 3<sup>rd</sup>, Bailey I, *et al.* Vitrectomy for the treatment of full-thickness stage 3 or 4 macular holes. Results of a multicentered randomized clinical trial. The Vitrectomy for Treatment of Macular hole Study Group. *Arch Ophthalmol* 1997;115:11-21.
  4. Lipham WJ, Smiddy WE. Idiopathic macular hole following vitrectomy: Implications for pathogenesis. *Ophthalmic Surg Lasers* 1997;28:633-9.
  5. Kumagai K, Ogino N, Furukawa M, Larson E, Uemura A. Surgical outcomes for patients who develop macular holes after pars plana vitrectomy. *Am J Ophthalmol* 2008;145:1077-80.
  6. Lee SH, Park KH, Kim JH, Heo JW, Yu HG, Yu YS, *et al.* Secondary macular hole formation after vitrectomy. *Retina* 2010;30:1072-7.
  7. Odrobina D, Laudańska-Olszewska I, Gozdek P, Maroszyński M, Amon M. Macular hole formation and spontaneous closure after vitrectomy for vitreomacular traction documented in spectral-domain optical coherence tomography. *BMC Ophthalmol* 2014;14:17.
  8. Odrobina D, Michalewska Z, Michalewski J, Dziegielewski K, Nawrocki J. Long-term evaluation of vitreomacular traction disorder in spectral-domain optical coherence tomography. *Retina* 2011;31:324-31.
  9. Yamada N, Kishi S. Tomographic features and surgical outcomes of vitreomacular traction syndrome. *Am J Ophthalmol* 2005;139:112-7.
  10. Falkner-Radler CI, Gabriel M, Binder S. Spontaneous closure of an idiopathic macular hole 9 months after unsuccessful vitreoretinal surgery. *Retin Cases Brief Rep* 2014;8:157-60.
-