

Successful management of persistent macular hole after macular hole surgery with intravitreal triamcinolone acetonide: A case report

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Department of Vitreo-Retina, Sadguru Netra Chikitsalaya, Chitrakoot, Madhya Pradesh, ¹Department of Ophthalmology, Indraprastha Apollo Hospital and Center for Sight, New Delhi, India

Correspondence to: Dr. Gaurav M Kohli, Department of Vitreo-Retina, Sadguru Netra Chikitsalaya, Chitrakoot - 210 204, Madhya Pradesh, India. E-mail: drkohligaurav@gmail.com

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*Alok C Sen, Gaurav M Kohli, Ashish Mitra,
Dinesh Talwar¹*

We present a case of persistent macular hole (MH) having an apical diameter of 140 microns and a basal diameter of 530 microns following a combined phacoemulsification and MH surgery. Considering post-operative cystoid macular edema (CME) as the possible reason for the failure of the initial surgery, a trial of IVTA was given. The synergistic effect of mechanical plugging of the hole by TA, coupled with resolution of cystoid changes and falling back of the macular hole resulted in the successful closure of the persistent macular hole with improvement in vision from 20/250 to 20/63.

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Key words: Cystoid macular edema, intravitreal triamcinolone acetonide, persistent macular hole

The incidence of persistent macular hole (MH) following surgery with internal limiting membrane (ILM) peeling is estimated to be around 10–12%.^[1]

There exists no consensus on time and type of re-surgery in cases of persistent MH. The re-intervention protocols include 1) reinjection of gas tamponade,^[2] 2) extension of ILM peel,^[3] 3) transplantation of a translocated ILM flap,^[4] 4) and the use of adjuvants like autologous serum or blood to plug the hole. The success rate, for these invasive procedures, yet remains variable. Herein, we present a case of persistent idiopathic MH successfully managed with intravitreal triamcinolone injection and discuss the mechanism of closure.

Case Report

A 63-year-old male reported to us for failure to improve vision in the left eye (LE) after a combined cataract and MH surgery at a regional specialty center 3 months ago. The patient was diagnosed to have grade 2 nuclear sclerosis with idiopathic MH, for which he underwent phacoemulsification with posterior chamber intraocular lens (PC-IOL) implantation and pars plana vitrectomy (PPV) with ILM peel. Perfluoro propane (C³F⁸) 14% was used as a tamponading agent.

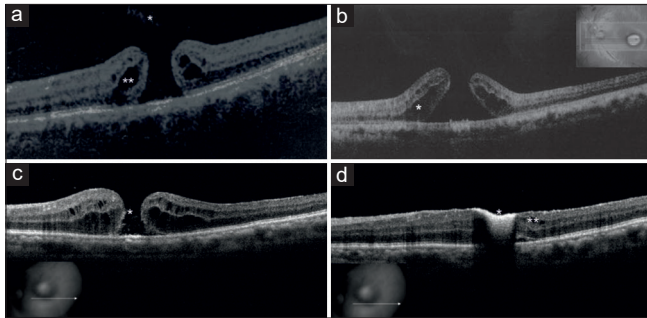


Figure 1: (a) Preoperative OCT scans show the presence of a full-thickness neurosensory defect at the macula with a separated hyoid face (*), there is the presence of cystic changes involving the margins of dehiscence (**), (b) The postoperative OCT 2 months after surgery shows the persistence of full-thickness defect at the macula along with cystoid changes (*), (c) The pre-injection OCT scan is suggestive of the persistent macular hole with swollen photoreceptor outer segments (*), (d) The postinjection (day-1) comparative OCT scan shows triamcinolone deposits plugging the macular hole is seen as a hyper-reflective plaque with optical back shadowing (*), there is a considerable reduction in intraretinal cystic changes (**) and retinal thickness

Following the primary surgery, the MH had failed to close [Fig. 1a and b], hence a second surgical intervention was advised by the primary surgeon. The patient on presentation to us had a CDVA of 5/60 in LE. The slit-lamp examination revealed a quiet anterior chamber with a well-centered PC-IOL. A full-thickness MH was seen on fundus examination. The apical diameter of the hole as measured by OCT was 140 μ m while the basal diameter was 530 μ m. The surrounding retina showed thickening with cystic changes involving the inner retinal layers [Fig. 1c]. A diagnosis of persistent MH with cystoid macular edema (CME) was made, and the patient was advised to undergo fluid-air exchange with gas tamponade.

However, on the patient's refusal for further surgical intervention we offered a trial of intravitreal steroid keeping in mind the possibility of post-operative CME as a contributory factor impeding closure of the MH. The patient consented for the same and was injected with preservative-free IVTA 4 mg in 0.1 mL (Aurocort © Aurolab, Madurai, India).

On the first day, following the injection, the triamcinolone particulate matter was seen plugging the MH and bridging the retinal defect. The OCT showed an evident reduction in the intraretinal cystic spaces and edema [Fig. 1d].

On the first follow-up visit at one week, the CDVA had improved to 6/24. Clinical examination revealed a blunted foveal reflex with no apparent dehiscence. OCT examination showed a foveolar detachment with opposed inner retinal layers and restoration of the foveal contour. The triamcinolone particles were evident as a hyperreflective plaque filling the foveal defect on OCT [Fig. 2b].

At 1 month follow-up, the CDVA had improved further to 6/18 and was maintained at 4 months also. The CDVA remained stable at 6/18 closed MH a small persistent foveolar detachment. The TA crystals had absorbed by this time [Figs. 2c and 3].

Discussion

Persistence of MH or its recurrence following successful closure has been reported in 10–12% of patients.^[1] The postulated reasons for persistent MH include 1) persistent tangential; 2) suboptimal volume or duration of tamponade, and 3) postoperative inflammation-driven CME. These factors either independently or cumulatively may contribute towards the failure of MH surgery.^[5]

The management strategies adopted for such failures are aimed at attending the precipitating factors: (1) reinjection of the tamponade, (2) extension of ILM peel or free ILM flap to plug the hole, (3) injection of autologous serum or blood to

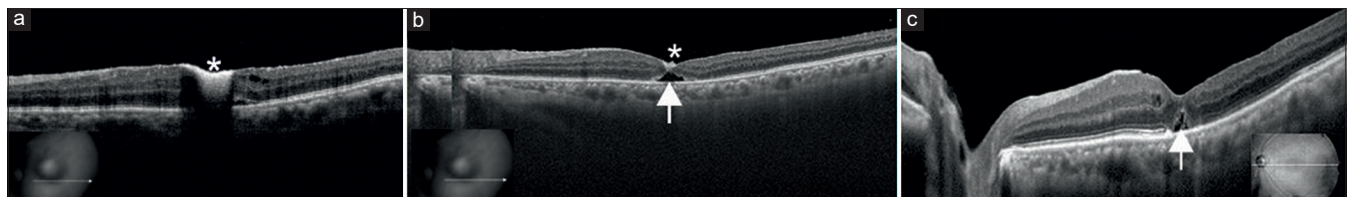


Figure 2: (a and b) serial OCT of the fovea at day 1 post-IVTA (a) and at 1 week following injection (b) show marked reduction in retinal thickness with near normalization of the foveal contour. The margins of the dehiscence get apposed with the resolution of edema, the draw bridge effects by the approximating margins is shown to close the defect (*). The macular hole appears closed with apposed inner retinal layers albeit a small persisting foveolar detachment exists (→). TA is evident as a hyper-reflective plaque at the foveal center (*). (b) OCT did 4 months after IVTA injection shows the closure of macular hole with a very small persisting foveolar detachment (→)

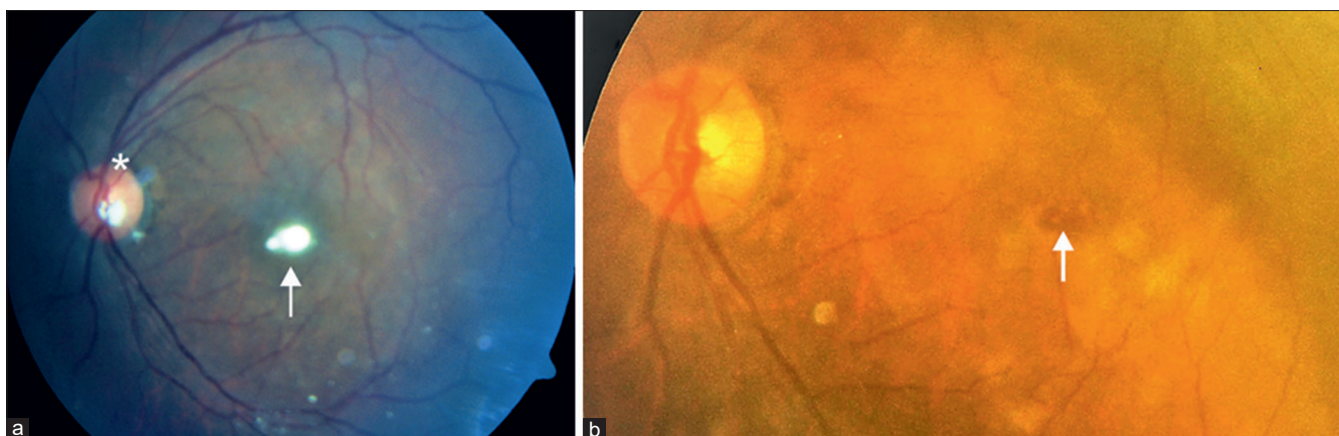


Figure 3: (a) The postinjection fundus photo shows triamcinolone crystals deposited over the disc and plugging the foveal defect seen as a white plaque. (b) At 1 month the macular hole appears closed with the resolution of triamcinolone

mechanically plug the defect. Steroids have seldom been used for the management of persistent MH. However, anecdotal reports do provide evidence of the possible role of steroids in cases of persistent MH associated with macular edema.

Yoon *et al.*^[6] reported successful closure of a full-thickness MH within 2 weeks which remained stable even after 6 months. The MH had developed 4 weeks after PPV for vitreous hemorrhage. They attributed the hole formation to macular edema and the reduction of macular edema with IVTA which was helpful in attaining closure.

Similarly, Shukla *et al.*^[7] reported a successful closure of MH in a case of intermediate uveitis with sub-Tenon's triamcinolone. The hole had persisted for 2 months after PPV with ILM peel and internal tamponade with 20% SF6 gas. They noted complete closure of hole within 1 week of sub-Tenon's injection. These reports suggest the potential role of steroids in the treatment of MH with associated intraocular inflammation.

The documentation of the mechanical plugging of the MH seen in our case [Fig. 2b and c] adds another dimension to the role of intravitreal steroids in the management of persistent MH, especially those associated with intraretinal cystic changes.

It seems quite evident, that apart from the anti-inflammatory role which brought down the retinal edema allowing the apposition of the inner retinal layers, the IVTA also helped by mechanically plugging the defect which was evident on fundus picture and OCT scans taken 1 week after injection [Figs. 1d and 2a]. Subsequent to the closure of the hole, a small plaque of the triamcinolone crystals persisted and was finally absorbed without causing any deleterious effect on the retinal photoreceptors [Fig. 2b and c]. The lack of toxicity of subretinal triamcinolone crystals has already been demonstrated.^[8]

Similarly, Kumar *et al.* noted the presence of triamcinolone particles plugging a traumatic MH and inferred that it possibly delayed hole closure.^[9] On the contrary, we believe that TA may have actually aided the hole closure in their case as it did in our case.

The TA deposits over the MH act like a temporary tamponade. The TA plugs the foveal defect and prevents further movement of vitreous fluid into the subretinal space. Once the fluid flux is halted, the retinal pigmentary epithelium (RPE) drives out the residual subretinal fluid aiding in the reposition of the retinal layers (neurosensory retina and RPE). In addition, the anti-inflammatory properties of TA allow a reduction in the cystoid spaces within the neurosensory retina. The mechanical advantages of TA act in synergism to its anti-inflammatory effects. The resolution of cystic changes and a simultaneous reduction in the retinal thickness produce a draw bridge-like effect allowing the approximation of the margins of dehiscence and opposes it to the underlying RPE.

Conclusion

IVTA could be considered as a treatment option for the treatment of small persistent MH, especially in cases with small holes associated with intraretinal cystic changes. Further, studies with a larger number of patients would, however, be needed to substantiate this observation.

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.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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