

Macular hole formation and spontaneous closure following neodymium-doped yttrium aluminum garnet capsulotomy in a vitrectomized eye

Sir,

The most widely accepted hypothesis on the formation of macular holes (MHs) is that direct anterior-posterior (AP) traction and tangential traction are exerted by the posterior vitreous cortex on the foveal region. AP traction occurs from dynamic traction created by an anomalous vitreofoveal adhesion that coexists with the premacular vitreous separation.^[1]

The development of an MH in a vitrectomized eye is rare, and MH formation after neodymium-doped yttrium aluminum garnet (Nd: YAG) capsulotomy for the treatment of posterior capsule opacification (PCO) is a very rare complication.^[2,3] We present a case of a MH formation and spontaneous closure after Nd: YAG capsulotomy for PCO in vitrectomized eye.

A 49-year-old male was referred to us in July 2011, after presenting with pseudophakic rhegmatogenous retinal detachment (RRD) in the left eye. His best-corrected visual acuity (BCVA) was counting fingers at 50 cm, and fundoscopy showed macula-off RRD in the left eye [Fig. 1a]. He underwent a pars plana vitrectomy with intraocular gas injection (SF₆, 20%) and endolaser photocoagulation. During the surgery, anterior vitrectomy was performed, complete detachment of the posterior hyaloid was induced, and the vitreous cortex was fully removed. Peeling of internal limiting membrane was not performed. Two months later, his BCVA improved to 20/25, and fundoscopy and optical coherence tomography (OCT) examinations showed reattachment of the retina of the left eye [Fig. 1b]. In December 2013, 3 days after Nd: YAG capsulotomy for PCO in the left eye (total power of 13.5 mJ, 9 spots at 1.5 mJ), he was referred again, presenting with decreased visual acuity and central scotoma. His BCVA was 20/80, fundoscopy and spectral domain OCT showed a full-thickness MH (FTMH) with cystoid macular edema (CME) [Fig. 2]. The patient declined surgery and as the MH was small (<100 μm), we decided to observe the patient. Three months later, OCT revealed a closed MH and a small residual foveal detachment [Fig. 3a]. After 6 months, his BCVA improved to 20/30, and OCT showed the disappearance of the cystic space and a normal foveal contour [Fig. 3b].

Although the pathogenesis of a secondary MH in a vitrectomized eye is not fully understood, Lee *et al.*, suggested a CME-related mechanism.^[2] In vitrectomized eyes, inflammatory mediators can more easily diffuse from the iris and anterior chamber to the macula, causing CME.^[4] In CME, small intraretinal cysts merge to form a larger cyst. This may directly rupture to form a FTMH, or the roof of the cyst may dehisce slowly, leading to a FTMH due to degenerative changes.^[2]

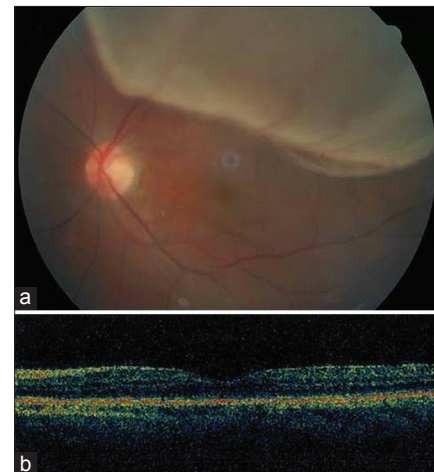


Figure 1: (a) Preoperative fundus photograph of the left eye. (b) Three months after vitrectomy, optical coherence tomography shows no residual subretinal fluid and reattachment of the detached retina

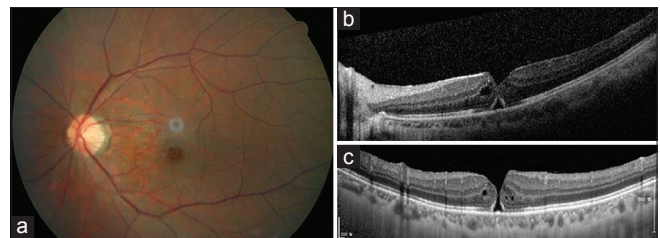


Figure 2: Fundus photograph and optical coherence tomography at 3 days after neodymium-doped yttrium aluminum garnet laser capsulotomy, showing a macular hole in the vitrectomized eye. (a) Color fundus photograph of the left eye. (b) Horizontal image and (c) vertical image of the fovea by optical coherence tomography, showing a full-thickness macular hole with macular cystic change

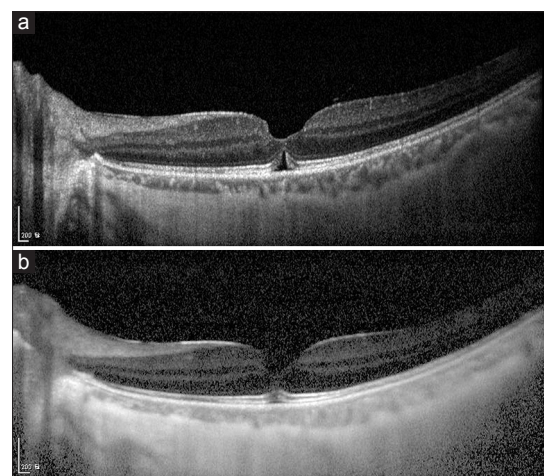


Figure 3: (a) The macular hole closed spontaneously with small residual foveal detachment, 2 months after it developed. (b) After 6 months, optical coherence tomography showed spontaneous closure of the macular hole, with a normal foveal contour

In this patient, we presume that Nd: YAG capsulotomy-induced inflammation caused small macular cystic change and thus FTMH. This small sized FTMH may be spontaneously closed with close observation in other cases.^[5] The absence of AP traction emphasizes the importance of other factors in MH formation and resolution. More work is needed to fully understand the importance of CME in MH formation and closure.

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Conflicts of interest

There are no conflicts of interest.

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References

- Gass JD. Idiopathic senile macular hole. Its early stages and pathogenesis. *Arch Ophthalmol* 1988;106:629-39.
- 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.
- García-Arumí J, Palau MM, Espax AB, Martínez-Castillo V, Garrido HB, Corcóstegui B. Reopening of 2 macular holes after neodymium: YAG capsulotomy. *J Cataract Refract Surg* 2006;32:363-6.
- Wilson CA, Benner JD, Berkowitz BA, Chapman CB, Peshock RM. Transcorneal oxygenation of the preretinal vitreous. *Arch Ophthalmol* 1994;112:839-45.
- Ezra E, Gregor ZJ; Morfields Macular Hole Study Ggroup Report No. 1. Surgery for idiopathic full-thickness macular hole: Two-year results of a randomized clinical trial comparing natural history, vitrectomy, and vitrectomy plus autologous serum: Morfields Macular Hole Study Group RAeport no 1. *Arch Ophthalmol* 2004;122:224-36.

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