Spontaneous closure of idiopathic full-thickness macular hole after release of vitreomacular traction observed on spectral-domain optical coherence tomography

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Abstract:
Macular hole is an idiopathic condition in most of the cases, it may also occur in retinal detachment, uveitis or after trauma. Optical coherence tomography analyses the vitreomacular interface, and according to the International Vitreomacular Traction Study, it defines and classifies as adhesion, traction, or macular hole. Idiopathic full-thickness macular hole (FTMH) a surgical procedure is needed to ensure its closure almost in all cases. Spontaneous closure happens mostly in Stage 1 or traumatic condition. We report a spontaneous closure of a Stage 2 idiopathic FTMH and partial reorganization in the photoreceptor layer documented by spectral domain optical coherence tomography after 6 months’ observation.

Keywords:
Optical coherence tomography, retina, visual acuity, vitrectomy, vitreoretinal surgery, vitreous detachment

INTRODUCTION
Macula hole is described associated after trauma, uveitis and mostly as an idiopathic condition[1] aged over 65 and female gender are some risk factor.[2]

Surgery is usually recommended but occasionally, spontaneous macular hole closure may occur. This condition is more related to traumatic cases.[3,4] Impeding macular hole considered as Stage 1, may have a spontaneous resolution chance (50%).[4] Instead, full-thickness macular hole (FTMH) is considered a surgical condition but in restricted cases uncommon spontaneous resolution is observed, a rare condition only seen in about 6% of the cases as shown in Yuzawa’s et al. study.[3]

We report an idiopathic Stage 2 FTMH spontaneous closure and partial reorganization of the external retina layers documented by spectral-domain optical coherence tomography (SD-OCT) technology after 6 months.

CASE REPORT
A 67-year-old female patient presented with a 5-week history of central scotoma in the left eye. Ophthalmic and past medical history was of no relevance. Ophthalmological examination showed best-corrected visual acuity (BCVA) of 20/30 and 20/200 in the right eye (OD) and left eye (OE), respectively. Anterior segment assessment showed 1+ nuclear cataract on both eyes (AO).

Posterior segment evaluation on OD showed no alteration, and OE the patient noted a complete break in a slit-lamp beam projected across the hole (Watzke–Allen sign) and FTMH was visible. According to the International Vitreomacular Traction Study Classification System, SD-OCT (using the RS-3000 Advance NIDEK Gamagori, Japan, 1971) showed a small Stage 2 FTMH (<250 mm) with vitreofoveal traction (VFT) at the nasal edge of the operculum on the left eye [Figure 1]. Pars plana vitrectomy for release of the VFT, inner limiting membrane (ILM) peeling and fluid/gas exchange with 12% perfluoropropane (C3 F8) was indicated.
The patient came back to the office only after 4 months for a new medical appointment. She noticed slight vision improvement without surgery. New examination was performed and showed a gain in line of sight with BCVA 20/70 in the OE, OD was stable. SD-OCT was performed and noticed complete closure of the FTMH with a small defect in the ellipsoid layer [Figure 2] and total spontaneous release of the VFT in the OE, OD remained stable.

Follow-up examination was indicated to evaluate a new SD-OCT image in 1, 3, and 6 months. FTMH on the left eye remained closed after 6 months with decrease of the ellipsoid layer defects as shown in Figure 3. After 6 months, the patients had a new slightly improvement of visual acuity with BCVA in left eye 20/40. Even though the patient had a 1+ nuclear cataract, she is comfortable with her spectacles. New appointment is scheduled in 6 months.

**DISCUSSION**

It is not known yet what factors determine the spontaneous closure of the macular hole.[5]

Some theories are reported in few studies which includes a proliferation of fibrous tissue in one pathway when the tangential traction of the posterior hyaloid is discontinued; retinal tissue edges of the macular hole; and relief of the VFT allowing its closure.[2,6]

We believe spontaneous closure in the left eye was due to the release of the posterior vitreous detachment process. Anteroposterior traction forces cessation allowed macular hole closure.

Observation by OCT examination can be considered in small FTMH cases with visual acuity better than 20/50.[3]

It is know that vitrectomy surgery with peeling of the internal limiting membrane and placement or not of air/gas tamponade is the most widely surgical technique. Although in macular holes bigger than 400 micron some surgeons likely to perform inverted peeling technique[1] with good anatomical results and questionable vision function results. Substances used to dye ILM may be toxic to some retinal cells including ganglion cells, retinal glial, and retinal pigmented epithelium with its direct contact to the fovea area and may induce damage.[7] Although some studies with new dyes, like acai, and its high anthocyanin concentration, so far, has been shown to be safe and therefore promising,[8] however, future studies are been waited.

Some structural changes at inner retinal surface topography, retinal edema and hemorrhages, paracentral scotoma when nerve fiber layer is inadvertent damaged are seen after ILM peeling.[7] Besides that specific diseases such as glaucoma, diabetes, high myopia may be associated with mechanical and metabolic changes and might have higher chance of injury during ILM peeling.

Studies reported safety and higher percentage of macular hole closure when peeling was performed in experienced hands.[9]

New technologies such as intraoperative OCT can perform a more precise analysis perioperative and evaluate retina layers and have been shown to be benefit in some cases reducing possibly unnecessary surgical movements.[10] This device reduced the use of dyes in almost one third of the cases, in one study, for epiretinal membrane.[10] Also helps to evaluate vitreomacular adhesions in Vitreomacular traction (VMT) and re-think the decision of peeling or not. Besides that may help the decision to use or not air/gas tamponade for macular hole surgery procedure.[10] Even so the search for improvements in the use of this technology is still being sought, mainly with the use of heads up surgery visualization system.

Further studies are needed to better understand the spontaneous closure of FTMH and its ellipsoid layer remodeling. Maybe new studies may help to distinguish in which cases the ILM peeling is necessary or in which cases the risks would not outweigh the benefits.

**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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Conflicts of interest
There are no conflicts of interest.

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