



Case report

Bilateral recurrent macular holes

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ABSTRACT

Purpose: To report an unusual case of bilateral recurrent full-thickness macular holes (FTMH) in both eyes of a single patient over a 15-year period, with a total of 3 FTMH in the right eye and 2 in the left eye. Each FTMH was successfully treated with vitreous surgery, resulting in hole closure and visual acuity improvement.

Observations: During the previous 15 years, a 59-year-old female developed a total of 3 FTMH in the right eye and 2 FTMH in the left eye. The initial FTMH in each eye was surgically closed with pars plana vitrectomy (PPV), epiretinal membrane (ERM) peeling, 14% C₃F₈ gas placement, and face down positioning. Subsequent recurrences of FTMH, 2 in the right and 1 in the left, were surgically closed with PPV and ERM peeling and/or indocyanine green-assisted internal limiting membrane peeling, 14% C₃F₈ gas placement, and face down positioning. Seven years following the last FTMH surgical closure, the patient's best-corrected visual acuity was 20/50 in the right eye and 20/32 in the left eye with no FTMH in either eye.

Conclusions and importance: This case illustrates that a rare individual may have more than one recurrent FTMH in both eyes. Final visual outcome can be favorable following closure of more than one recurrent FTMH.

1. Introduction

Idiopathic full-thickness macular holes (FTMH) lead to loss of central vision and are most commonly caused by vitreous-mediated anteroposterior or tangential forces on the retinal surface.¹ The prevalence of FTMH is estimated to be 3.3 per 1000, with 70% of patients being female.² The majority develops a FTMH in only one eye and is able to maintain good visual acuity in the unaffected fellow eye. Chew and colleagues³ found that the rate of development of new macular holes in fellow unaffected eyes was low at 4.3% within 3 years of baseline examination. Reopening of a previously successfully operated macular hole is also uncommon with a reported rate of 4.8%–9.5%.^{4,5}

We report a unique case of bilateral recurrent full-thickness macular holes, 3 in the right eye and 2 in the left eye, each successfully treated with pars plana vitrectomy (PPV) resulting in hole closure and visual acuity improvement.

2. Case report

In 2002, a 59-year-old mildly myopic healthy female smoker presented with a two-month history of FTMH in the right eye. Best-corrected visual acuity (VA) was 20/80 in the right eye and 20/20 in the left eye. There was 2 + nuclear sclerosis in each eye. There was a

posterior vitreous detachment (PVD) and a mild epiretinal membrane (ERM) in the right eye. She underwent a 20g pars plana vitrectomy (PPV) with ERM peeling and 14% C₃F₈ gas placement followed by two weeks of face down positioning. No indocyanine green (ICG) staining was used. One month postoperatively, the macular hole was closed and a subfoveal lucency was present (Fig. 1 A). The VA improved to 20/40 in the right eye at 3 months with resolution of the subfoveal lucency (Fig. 1 B). In 2003, a FTMH developed in the left eye with a decrease in VA to 20/50. A PVD and an ERM were present. She underwent a 20g PPV with ERM peeling and 14% C₃F₈ gas placement followed by two weeks of face down positioning. No ICG staining was used. One month postoperatively, the macular hole closed and a subfoveal lucency was present (Fig. 2 A). The VA improved to 20/25 over time with resolution of the lucency in the left eye (Fig. 2 B).

Due to progression of cataracts following the vitrectomy, she underwent uneventful cataract extraction and intraocular lens implantation in both eyes in 2004–5, and vision improved to 20/25 in both eyes.

In 2006, 3 years after successful FTMH closure, the left eye developed a recurrent FTMH associated with recurrent ERM formation (Fig. 2 C). VA decreased to 20/64. She underwent 20g PPV with ERM peeling and ICG-assisted internal limiting membrane (ILM) peeling and 14% C₃F₈ placement followed by two weeks of face down positioning. At postoperative week 6, the hole was closed, and VA improved to 20/

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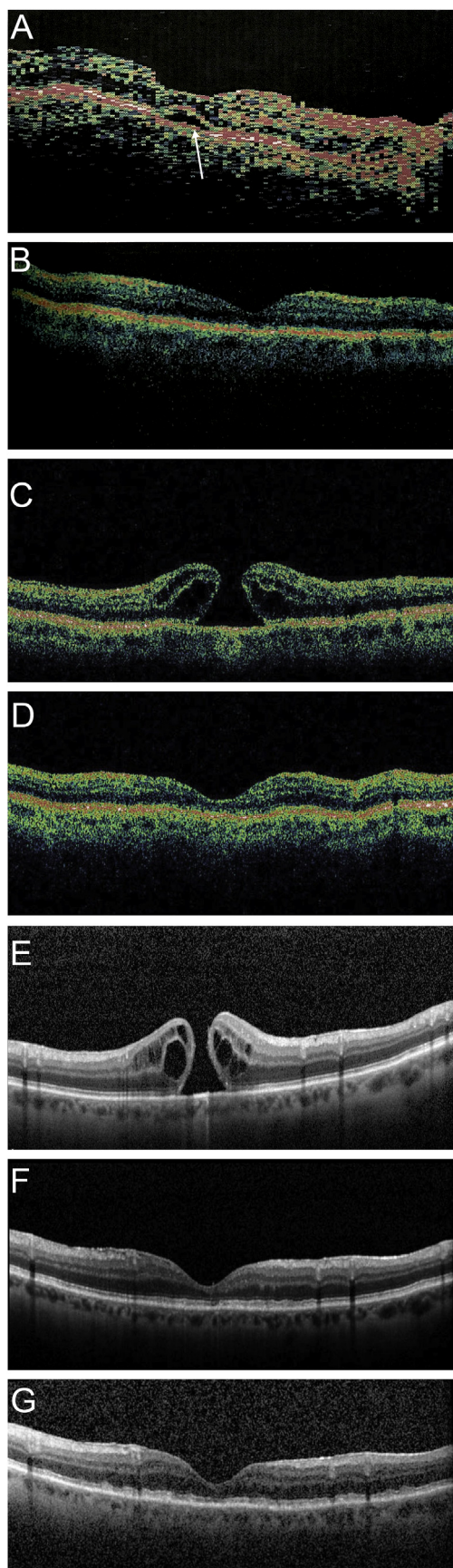


Fig. 1. Sequential optical coherence tomography (OCT) images of the right eye of a 59-year-old female presenting with bilateral recurrent macular holes. The right eye initially presented with full-thickness macular hole (FTMH) and epiretinal membrane (ERM) in 2002 A. Following pars plana vitrectomy (PPV) with ERM peeling, the hole closed at month 1 postoperatively with a residual subfoveal lucency (white arrow, Zeiss Humphrey OCT 2, Carl Zeiss Meditec, Dublin, CA). B. The hole was closed at 4 years follow up with complete resolution of the subfoveal lucency (Stratus OCT, Carl Zeiss Meditec, Dublin, CA). C Five years following the initial surgery, there was a recurrent FTMH in the right eye. D. One month following repeat PPV, the hole had closed. E. The hole reopened again 8 years following the initial surgery (Spectralis OCT, Heidelberg Engineering, Carlsbad, VA). F. One year following the third PPV, the hole closed; there was a thin, recurrent nasal extrafoveal ERM. G. At the most recent follow-up, 15 years following the initial surgery, the macular hole remains closed, with no subfoveal lucency, relatively intact outer retinal bands, and changes consistent with dry age related macular degeneration.

40 (Fig. 2 D).

In 2007, 5 years after successful FTMH closure, a recurrent FTMH developed in the right eye (Fig. 1C), and VA decreased to 20/64. No ERM was present. She underwent 20g PPV with ICG-assisted peeling of the ILM, and 14% C₃F₈ gas placement followed by two weeks of face down positioning. One month postoperatively, the hole was closed (Fig. 1 D), and the VA improved to 20/50. VA further improved to 20/32 in each eye without correction in 2008.

In 2010, 3 years after successful FTMH closure, she developed a recurrent FTMH with a recurrent ERM in the right eye (Fig. 1 E), and VA dropped to 20/50. An intravitreal injection of triamcinolone followed by 0.3 cc of 100% C₃F₈ was administered in the office. The hole remained open. She underwent a 23g PPV in the right eye with ERM peeling. ICG staining revealed no ILM. 14% C₃F₈ gas was placed followed by 10 days of face down positioning. One month postoperatively, the hole was closed. VA improved to 20/40 (Fig. 1 G).

At her most recent visit in 2017, fifteen years following the first macular hole, VA was 20/50 in the right eye and 20/32 in the left eye with no further recurrences of the macular hole in either eye (Figs. 1G and 2E).

3. Discussion

The formation of bilateral idiopathic FTMH is a relatively rare clinical phenomenon. Ezra et al. conducted the first prospective study of the incidence of idiopathic FTMH in the fellow eye in 1998 and reported a 7.5% involvement rate at 18 months and 15.6% involvement rate at five years in previously unaffected fellow eyes without PVD.² Chew et al. performed a prospective study without accounting for presence of PVD at baseline and reported lower rates of involvement of the fellow eye: 4.3% within 3 years, 6.5% at 4–5 years, and 7.1% at 6 or more years.³ The mean interval time between onset of the first FTMH to the onset of a macular hole in the fellow eye was found to be 26.1 months with no significant difference between men and women in a retrospective study by Kumagai et al.⁶ The presence of predisposing foveal lesions, such as an impending hole in the fellow eye, increases the risk of progression to FTMH by 40–60%.¹ The risk of progression to FTMH in the fellow eye with a preexisting PVD has been reported to be < 1%.¹

After initial successful surgical repair of FTMH in both eyes, our patient presented with two recurrences in the right eye and one in the left eye over a 15-year time period. Reopening is an uncommon outcome of a successfully closed FTMH, and the exact mechanism of reopening is not well understood. ILM peeling is now widely used in macular hole surgery, with reduction in the rate of reopening from 2% to 16% in eyes in which the ILM was not peeled to 0%–8.6% in eyes in which the ILM was peeled.⁷ The lower rate of reopening after ILM peeling suggests that ILM contracture may be involved in the reopening process. Our patient did not undergo ILM peeling with the first PPV in

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