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Intentional use of topical latanoprost with resulting macular edema to help in the closure of a failed, chronic, macular hole

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ABSTRACT

Purpose: To report a case where the induction of macular edema with topical latanoprost coupled with in-office gas injection effectively sealed a persistent, chronic, macular hole.

Observations: A 70-year-old, pseudophakic, patient presented with a stage three, chronic, macular hole (MH) and vision reduced to 20/200. The symptoms had been present for 18 months. Patient had surgery with pars plana vitrectomy (PPV), complete internal limiting membrane (ILM) peel to the arcades, 30% SF_6 gas, and excellent face down positioning for five days. Two weeks after surgery the macular hole failed to close, and the edges of the hole were blunted with very little retinal edema and vision reduced to 20/400. The patient did not want to go back to the operating room. After informed consent, the patient was started on topical latanoprost 0.005% on the operative eye twice a day for six weeks. After latanoprost induction of cystoid macular edema (CME), the patient had 0.7 cc of pure C_3F_8 injected into the vitreous cavity in the office and was instructed to be face down for five days. Two weeks later the macular hole was closed with vision of 20/80. Last corrected vision eight months later was 20/50.

Conclusions and Importance: The findings in this case suggest that induction of CME facilitated the closure of a chronic, persistent, macular hole with a simple gas injection in the office and face down positioning for five days.

1. Introduction

Macular hole (MH) surgery has been evolving since first proposed by Kelly and Wendel in 1991.[1] Current standards for the treatment of a MH include pars plana vitrectomy (PPV), removal of cortical vitreous, internal limiting membrane (ILM) peeling, complete fluid-gas exchange, and face down positioning postoperatively with over 95% success.[2] Despite these advances, when the MH is in a high myope and/or is large and chronic, the success rate declines. Many surgical techniques have been described such as ILM flap or hydrodissection.[3,4] Here is the first report of a chronic macular hole that failed surgery, then was closed with topical medication and injection of gas in the office.

2. Case report

A 70-year-old, pseudophakic, woman gave a very good history of noting a central scotoma for 18-months prior to seeking help. A stage three, chronic, macular hole with a diameter of 506 μm was diagnosed (Fig. 1). One week later, PPV and wide ILM removal to the arcades was coupled with a complete gas fluid exchange using 30% SF_6. She positioned extremely well and was not a high myope.

Two weeks post-op, the macular hole remained open with blunted edges and very little edema, as seen by OCT and thickness map (Fig. 2). Post-op clinical imaging indicated she would need additional surgery in the operating room for an ILM flap and/or hydrodissection.[3,4] The patient did not want to go back to the operating room at that time. The patient consented to use of topical latanoprost for inducing cystoid macular edema (CME) in hope of facilitating closure. She was started on topical latanoprost 0.005% twice a day for six weeks, fourteen days after failed MH surgery.

After six weeks of topical latanoprost, imaging showed the CME had greatly increased (Fig. 3), and latanoprost was stopped. After paracentesis, 0.7 cc of pure C_3F_8 gas was injected to give a final volume of 50% fill when checked 2 days later. It was stressed to the patient she maintain a face down position as much as possible for the next five days, both day and night and to use topical lubricant drops four times a day. She was highly compliant, and two weeks later, the macular hole was closed with vision improved to 20/80. Follow up eight months later

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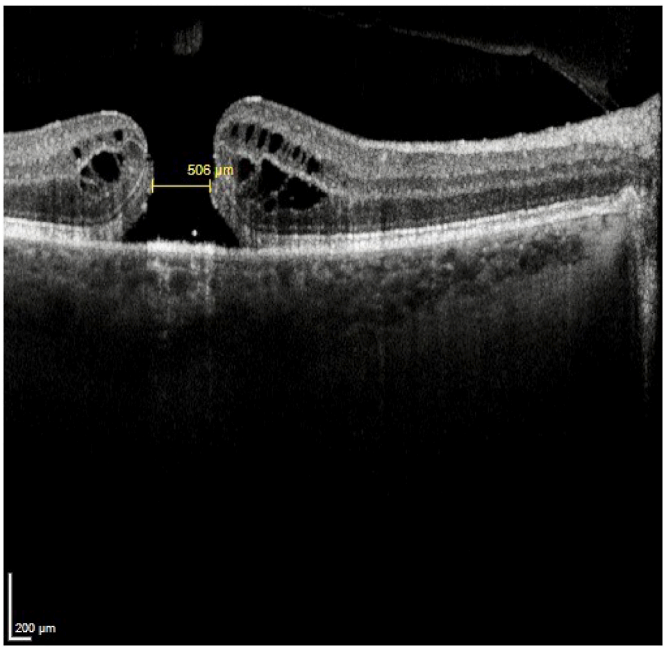

Fig. 1. Chronic macular hole with a diameter of 506 µm, prior to surgery.

Fig. 3. OCT after six weeks of topical latanoprost, showing marked increase in the hydration of the MH edges with a diameter of 445 µm.

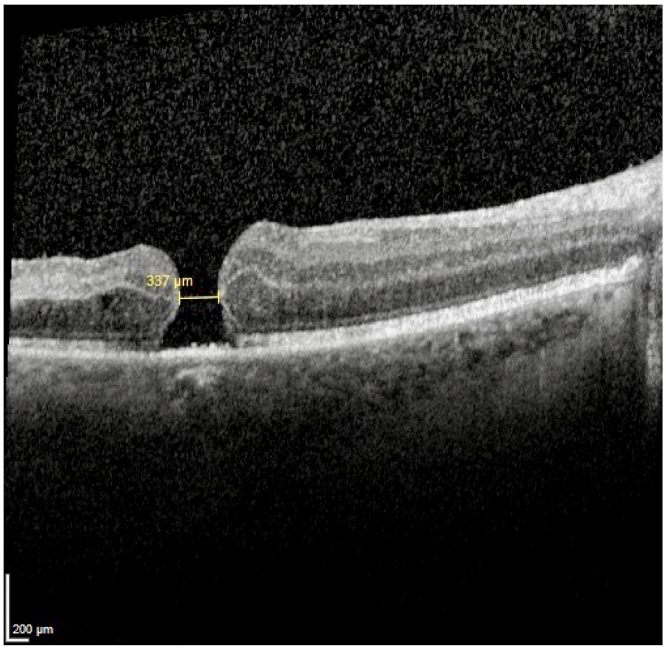

Fig. 2. MH two weeks after failed surgery with a diameter of 337 µm, but no edema.

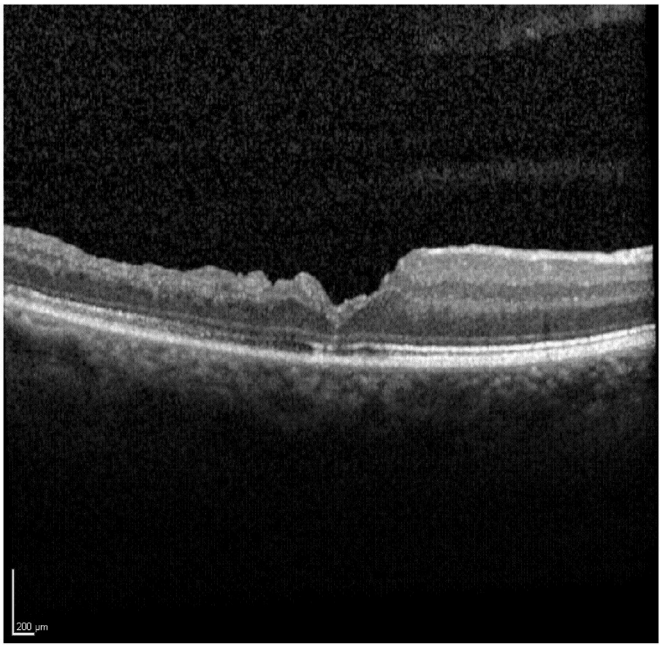

Fig. 4. Final OCT 8 months after surgery, with a VA of 20/50.

revealed a closed macular hole with a vision of 20/50 (Fig. 4).

3. Discussion

To our knowledge, this is the first reported case of a chronic macular hole that failed standard surgery.then was effectively managed in-office with a combination of topical latanoprost and subsequent gas injection. Although we cannot exclude the possibility that gas injection alone would have closed the hole, clinical experience suggests refractory MHs without edge edema are unlikely to close, and may actually enlarge after in-office gas injection. Current literature states that when faced with a recurrent chronic macular hole, the treatment is always a return to the operating room; whether to enlarge the ILM peel, create an ILM flap, or to create a limited fluid dissection of the macula.[3,4]

Latanoprost given shortly after cataract surgery has an 81% chance of inducing CME.[5] In this case report, the vitrectomy procedure two weeks prior may have induced inflammation that promoted macular capillary leakage (Fig. 3). Also, administration of latanoprost twice a day instead of once a day may have facilitated the edema. In eyes that have not had intraocular surgery, CME is rarely seen with topical latanoprost.[6]

Interestingly, reports of topical steroids or dorzolamide to clear up retinal edema have shown closure of smaller, non-chronic MH's.[7–9] These studies were based on the hydration theory for macular hole

formation.[10] This case report suggests that hydration of the edge of a larger MH with dry edges may be helpful in hole closure, in conjunction with gas tamponade.

4. Conclusions

The mechanism of success in MH surgery involves getting the edges of the hole to approximate, with gas tamponade allowing for the formation a fibrin plug that causes an adherence of the edges.[2] Subsequent adherence creates a waterproof environment that allows the retinal pigment epithelium to pump out the retinal edema and hopefully improve vision and/or contrast sensitivity. The etiology of hydrodissection is poorly understood. A recent report hypothesized a possible mechanism that surgically hydrating the MH edges provides volume and decreases the MH size.[4]

In this case, the MH size increased from 337 μm (Fig. 2) to 445 μm (Fig. 3) eight weeks after initial surgery, but the overall thickness and volume of the edges also increased greatly after latanoprost therapy (Fig. 3). The greater volume perhaps allowed pliability for the edges to touch and reduced tangential traction that could overcome the force of the fibrin plug adherence.

If confirmed by further clinical study, our experience with this case suggests inducing edge edema with topical latanoprost may facilitate closure of a refractory macular hole.

Patient consent

No consent was signed. This report does not contain any personal information that could lead to the identification of the patient.

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Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

Declaration of competing interest

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