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Case report

Micropulse laser for persistent optic disc pit maculopathy. A case report

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ABSTRACT

Purpose: Optic disc pits (ODP) are rare and congenital anomalies of the optic disc, sometimes remaining asymptomatic. However, serous macular detachment or optic disc maculopathy is the most common complication, causing significant visual deterioration, without a current consensus about treatment. We describe a case of ODP maculopathy that was treated successfully with micropulse laser.

Observations: A patient with ODP maculopathy remained with macular serous detachment after nine months of follow up after pars plana vitrectomy. Subthreshold micropulse laser was used to treat macular serous detachment, achieving a significant improvement in central macular thickness after one session.

Conclusions and importance: Subthreshold micropulse laser is designed to stimulate the retinal pigment epithelium without damage to the photoreceptors, resulting in absorption of subretinal and intraretinal fluid. Macular serous detachment in patients with ODP requires a prompt diagnosis and treatment to avoid damage to photoreceptors. Subthreshold micropulse laser is a potential treatment for eyes with ODP and macular serous detachment complication.

1. Introduction

Optic disc pits (ODP) are rare congenital anomalies of the optic disc, occurring equally in men and women with an incidence of 1 in 11,000 patients.[1] Optic disc pits usually remain asymptomatic, and may be found incidentally. However visual problems arise most commonly in the second to fourth decades, when serous macular detachments or optic disc maculopathy develop, causing significant visual deterioration.[1,2] Maculopathy presents in 25–75% of patients with an ODP, and although spontaneous reattachment has been reported, most of the cases have a poor prognosis with gradual worsening of visual acuity.[1–4]

The mechanisms underlying ODP maculopathy remain unclear, especially in relation to subretinal fluid accumulation.[5] There is currently no consensus regarding its optimal treatment, and several approaches have been attempted, with variable results and a high incidence of recurrence.

1.1. Case report

A 24-year-old woman without relevant past medical history consulted due to a 4-month history of progressive painless visual loss in her right eye. Her best corrected visual acuity (BCVA) was 20/400 OD and 20/30 OS. Anterior segment examination was unremarkable and dilated fundus examination of OD showed an oval grayish-yellowish crater-like depression on the temporal aspect of the optic disc (Fig. 1a.) suggestive of an ODP with associated serous macular detachment (Fig. 1b.).

Additionally, optical coherence tomography (OCT) of OD showed serous macular detachment with central macular thickness (CMT) of 450 μm (Fig. 2a). Fluorescein angiography showed RPE atrophy, but no leakage (Fig. 3). A pars plana vitrectomy (PPV) with posterior hyaloid detachment and SF_6 gas tamponade without laser treatment was performed

Nine months after surgery there was a slight improvement, but persistent retinal detachment. BCVA was 20/400 and retinal examination showed subretinal fluid documented both clinically and by OCT, with a CMT of 355 μm (Fig. 2b).

After obtaining informed consent, subthreshold yellow 577-nm pattern micropulse laser (IRIDEX IQ 577 with TxCell) was used to treat the right eye, using a 5% duty cycle, power of 400 mW, spot size of 200 μm, exposure time of 200 ms, and a 7 × 7 confluent grid pattern covering the entire macular area, which required 850 spots.

One moth following treatment, the patient noted improved symptoms, BCVA had improved to 20/200, and OCT examination demonstrated reduction of CMT to 254 μm (Fig. 2c). Four months after micropulse laser treatment, BCVA was 20/60 and OCT revealed absence of

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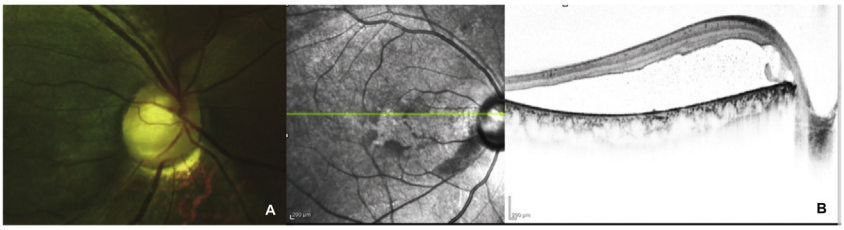

Fig. 1. Anatomical description. A: Optic pit in right eye. B: serous macular detachment associated with optic pit.

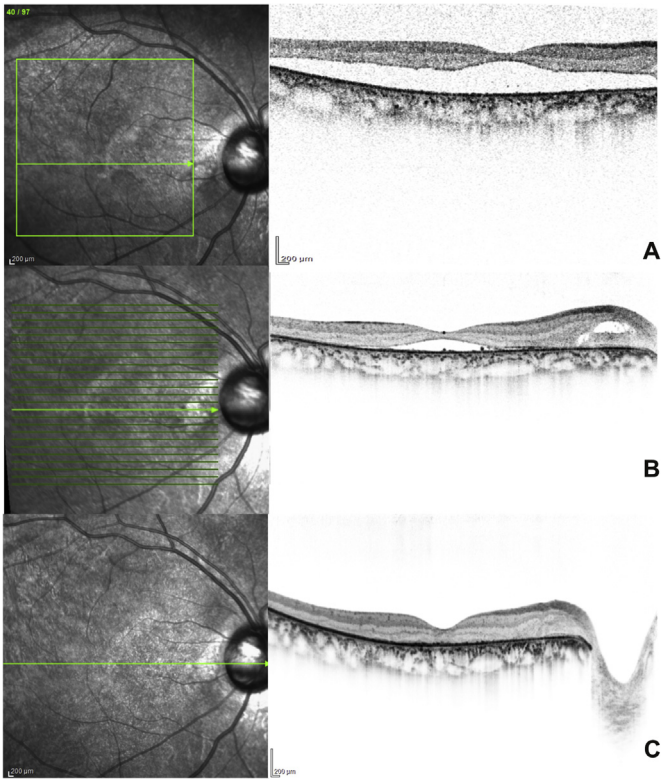

Fig. 2. Macular detachment progression in OCT. A: Nine months after PPV, subretinal fluid persists. B: one month after subthreshold yellow 577-nm pattern micropulse laser treatment. C: four months after micropulse laser treatment. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

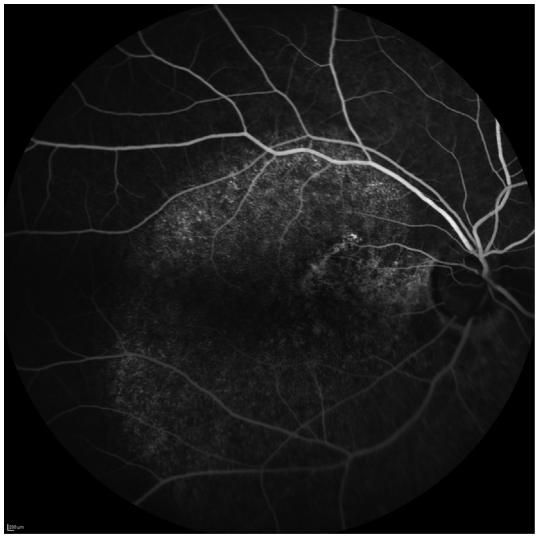

Fig. 3. Fluorescein angiography showing RPE atrophy due to chronic detachment, but no leakage.

subretinal fluid with a CMT of 188 μm (Fig. 2).

2. Discussion

The pathophysiology of ODP is not completely understood. Over the years, different possibilities have been proposed as the source for the fluid in the subretinal space in ODP maculopathy. The most accepted theories are the vitreous and cerebrospinal fluid, both confirmed by the pass of dye from the vitreous to the subretinal space in the first theory, and from subarachnoid space to subretinal fluid in the latter. Other less accepted theories are the origin in retinal vessels or the choroid.[1]

Generally, patients have poor prognosis and there is no ideal treatment. Laser photocoagulation at the temporal margin of the optic disc has been used as a treatment for ODP maculopathy, trying to create a barrier between the ODP and the subretinal space. However, thermal laser treatment applied in that area could potentially cause great visual field defects and results are nonconsistent.[2]

Vitrectomy with or without gas tamponade has been reported to be an effective treatment and is widely used. However, persistence of subretinal fluid and controversy surrounding appropriate additional maneuvers (eg, induction of posterior vitreous detachment or internal limiting membrane peeling) means that there is still no standard treatment for ODP maculopathy.[1–8] The success rate after vitrectomy for ODP maculpathy is around 70–92.3%, and there is no consensus regarding the appropriate treatment in case of failure.[2,8] Time of complete resolution has been reported around six months in about 60% of patients, and in some cases resolution can be expected until month twelve after surgery.[6] Nevertheless in our case there was minimal decrease in the amount of subretinal fluid by the ninth month.

Subthreshold micropulse laser is designed to target the RPE without damage to the photoreceptors by raising the temperature of the RPE below the temperature that causes protein denaturation. This photostimulating effect leads to the activation of the RPE cells, which causes expression of heat shock proteins and other factors. Because heat shock proteins may block the activity of apoptotic and inflammatory pathways that cause cellular damage, micropulse laser may facilitate RPE remodeling and contribute to improvements in inducing reabsorption of intra and subretinal fluid.[9] Subthreshold micropulse laser has been used successfully in various macular pathologies with persistent retinal detachment,[10] which led us to use it in the case hereby presented, with a favorable outcome. There are other less invasive options, like pneumatic displacement, first described by Lincoff et al.,[11] demonstrating the therapeutic effect of a gas tamponade. Micropulse laser could be combined with pneumatic displacement, in an effort to improve the time of resolution or in partial response cases.

3. Conclusions

In this case, subthreshold pattern micropulse laser seemed to induce regression of intra and subretinal fluid that had persisted for several months after pars plana vitrectomy. Further research regarding this indication for micropulse laser should be performed in order to ascertain its place in the management of ODP maculopathy.

Patient consent

Informed consent was obtained written from this patient for publication of her case details. This report was conducted with IRB approval. All information was gathered with the consent of the patient, consistent with HIPAA.

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Authorship

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

Conflicts of interest

The following authors have nothing to disclose CVL, NC, IAL.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.ajoc.2018.04.002.

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