• Letter to the Editor •

Auto-transplantation of the anterior lens capsule and blood for a recurrent large macular hole

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Dear Editor,

Herein, we present an interesting case of a recurrent, large macular hole (MH) treated with phacovitrectomy and auto-transplantation of the anterior lens capsule and blood. It is well known that pars plana vitrectomy (PPV) surgery has a high success rate in the treatment of MHs. Unfortunately, MHs can persist if they remain open or reopen after surgery. These are not only a barrier to vision recovery, but also confer the risk of retinal detachment. Recurrent or persistent MH treatment remains a challenge for vitreoretinal surgeons. Herein, we report a case of a recurrent, large MH in which the anterior lens capsule and blood were auto-transplanted to close the hole.

A 59-year-old healthy woman with moderate myopia (-4.00 diopters) presented with a 2-month history of an idiopathic full-thickness hole (diameter of 745 μm) in her right eye (Figure 1A). The best-corrected visual acuities (BCVAs) were 0.05 in her right eye and 1.0 in her left eye. She underwent 23-g PPV with indocyanine green (ICG)-associated internal limiting membrane (ILM) peeling and silicone oil filling followed by one week of face-down positioning, achieving closure of the MH (Figure 1B) and improving the BCVA to 0.15 one month after the surgery.

Three months postoperatively, the macular area was stable, and the patient underwent silicone oil removal. However, 6mo after successful MH closure, she developed a recurrent, large MH (diameter of 716 μm) in her right eye (Figure 2A). The BCVA in the right eye decreased to 0.05. We then performed phacovitrectomy and auto-transplantation of the anterior lens capsule and blood in the patient. We first performed phacoemulsification procedures and used the anterior capsule as a free flap (diameter of 5 mm). Standard 3-port 23-g PPV was then performed. Since ILM peeling was performed during the previous surgery, we directly performed auto-transplantation of the anterior lens capsule. With a decrease in perfusion, the flap was slowly placed at the surface of the MH using intraocular forceps. One millilitre of fresh autologous blood was obtained from the patient's antecubital vein, and one drop (approximately 0.1 mL) of autologous blood was injected gently to cover the flap on the surface of the MH. The fresh blood serum turned into a clot with the flap quickly. A fluid-gas (C_3F_8) exchange was performed at the end of the surgery followed by one week of face-down positioning. One week later, the blood had completely absorbed. One month later, optical coherence tomography (OCT) showed that the MH had completely closed, and the BCVA in the right eye had improved to 0.15. Furthermore, there were no additional recurrences of MHs during a follow-up period of 6mo (Figure 2B), and the BCVA in the right eye improved to 0.25 during this period. We also found no change in the size of the anterior lens capsule auto-transplanted in the macular area during the 6-month follow-up period.

PPV with posterior hyaloid removal, ILM peeling, and gas filling is the standard treatment technique for full-thickness MHs. Although the closure rate of MHs can reach 90% or higher, closure is not achieved in approximately 10% of patients, especially in cases of large MHs, high degree of myopia, or other non-idiopathic conditions[1-2]. In previous studies, some clinicians used ILM insertion or lens capsule coverage and insertion, whereas others used autogenous serum, autogenous blood, concentrated platelets, or biological agents such as transforming growth factor β-2 as the tissue adhesive to improve the success rate of surgery[2-9]. However, there is no conclusion. In this letter, we share a case report and suggest that the combination of autologous blood and the anterior lens capsule may comprise a new surgical modality.

The main advantages of this technique are as follows. First, similar to the ILM, the lens capsule fills the entire MH and may provide a stronger bridge for the proliferation of glial cells[7]. If the ILM has already peeled within the arcade during

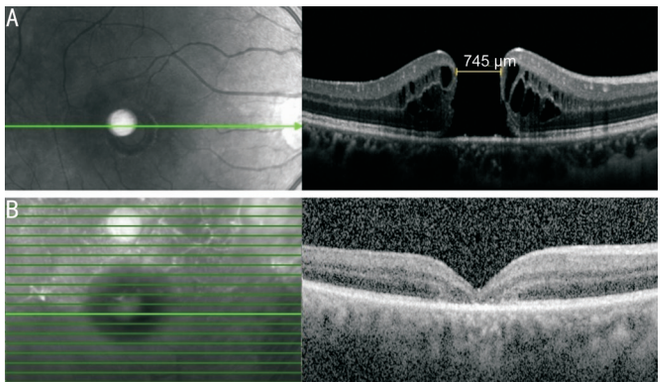

Figure 1 OCT images before and after the operation of 23-g PPV with ILM peeling and silicone oil filling A: OCT image of the right eye presenting with MH (745 μm); B: Three-month follow-up OCT image showing closure of the hole after 23-g PPV with ICG-associated ILM peeling and silicone oil filling.

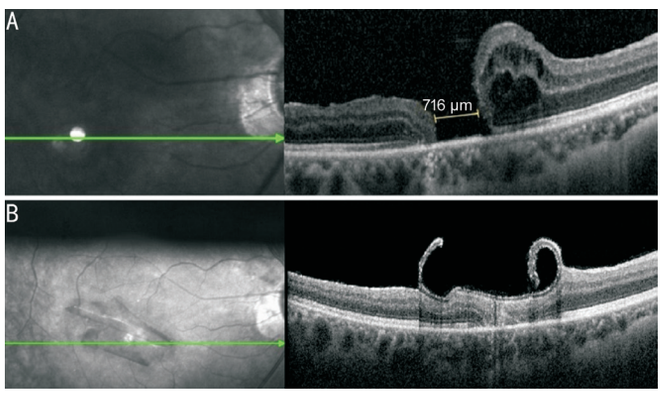

Figure 2 OCT images before and after the operation of phacovitrectomy and auto-transplantation of the anterior lens capsule and blood A: Six-month follow-up OCT image showing that the right eye had developed a recurrent, large MH (716 μm) after the 23-g PPV with ICG-associated ILM peeling and silicone oil filling; B: Six-month follow-up OCT image after the surgery showing that the hole was stable after the phacovitrectomy and auto-transplantation of the anterior lens capsule and blood.

previous surgeries or only ILM fragments can be obtained in some cases, we cannot acquire a usable ILM for the surgery. Therefore, the anterior capsule is an affordable alternative. Second, components such as platelets and growth factors contained within the blood could facilitate complete sealing of the MH[8-9]. Moreover, autologous blood is readily available and easy to prepare during a surgery. In addition, there is no risk of rejection when using autologous blood for patients. Therefore, the combination of these two procedures, lens capsule application and autologous blood coverage, may be more effective for the closure of recurrent, large MHs. Furthermore, blood clots may fix the flap on the macula, reducing the risk of floating in the vitreous cavity during or after the surgery and shortening the operative time.

A limitation of this surgery is that the size of the lens capsule is slightly large for the MH. We should modify this appropriately in the future. It is necessary to further establish the advantages of this technique and evaluate whether there are long-term complications based on prospective studies with long follow-up times and large numbers of patients.

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