• Letter to the Editor •

Choroidal hemangioma excision with retinal pigment epithelium-choroid graft

Yi–Keng Huang[1,2], *Xiong–Gao Huang*[1]

[1]Key laboratory of Emergency and Trauma of Ministry of Education, Department of Ophthalmology, the First Affiliated Hospital of Hainan Medical University, Haikou 570102, Hainan Province, China

[2]Department of Ophthalmology, Shanghai General Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai 200080, China

Correspondence to: Xiong-Gao Huang. No.31 Longhua Road, Longhua District, Haikou 570102, Hainan Province, China. hxg_eye@163.com

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Dear Editor,

Choroidal hemangioma is a benign vascular tumor originating from the choroidal vasculature, classified into circumscribed and diffuse subtypes[1]. Circumscribed choroidal hemangioma (CCH) typically presents as an orange-red posterior pole mass, frequently asymptomatic but potentially causing vision loss, metamorphopsia, or retinal detachment (RD) when symptomatic. Current guidelines recommend treatment only for symptomatic CCH, with photodynamic therapy (PDT) considered first-line due to its efficacy and safety[2]. However, PDT shows limited effectiveness in large CCH, with higher recurrence rates[3-4]. This case report explores surgical management for large posterior pole CCH complicated by exudative RD, addressing an unmet clinical need. This report follows the tenets of the Declaration of Helsinki. Written informed consent was obtained from the participant prior to the enrollment of this case report. This study was approved by the Ethics Committee of the First Affiliated Hospital of Hainan Medical University (approval number: 2025-J-018).

CASE PRESENTATION

A 52-year-old male presented with progressive visual decline in the left eye for 8y, with vision limited to hand move/30 cm and no improvement on correction. Fundus examination (Figure 1A) revealed a well-demarcated, round, orange-yellow elevated lesion (approximately 5×6-disc diameters) in the macula, accompanied by RD extending from the 12 to 8 o'clock positions. Optical coherence tomography (Figure 1B–1C) demonstrated RD with cystic degeneration and underlying choroidal elevation. Doppler ultrasound (Figure 1D–1F) identified an oval hyperechoic mass in the posterior pole with internal blood flow signals. Fluorescein angiography and indocyanine green angiography (Figure 1G–1H) showed early filling of enlarged choroidal vessels within the macular vascular arcade, with hyperfluorescence.

The surgical approach was selected based on a thorough assessment of the tumor's distinctive features, the clinical applicability of available therapeutic options, and the patient's socioeconomic and psychological considerations (Figure 1I–1L). The surgical video has been edited to approximately 9min in length and is publicly available on Figshare platform (URL: https://figshare.com/articles/media/Surgical_Video_mp4/29616662; DOI: 10.6084/m9.figshare.29616662). The surgery began with phacoemulsification and complete lensectomy, including posterior capsule removal, to optimize fundus visualization and facilitate tumor extraction. Given the complexity of the tumor lesion and unpredictable postoperative recovery, primary intraocular lens (IOL) implantation was deferred. A peripheral iridotomy (Ando procedure) was then performed to prevent postoperative intraocular pressure elevation and enhance aqueous outflow. Subsequently, pars plana vitrectomy was carried out, followed by peripheral retinotomy to fully expose the tumor. After bipolar diathermy of surrounding vessels, the tumor along with the full-thickness choroidal tissue was excised and extracted through the corneal incision. An autologous retinal pigment epithelium (RPE)-choroid graft harvested from the superotemporal periphery was transplanted to cover the choroidal defect. Perfluorocarbon liquid was used to reattach the retina, followed by 532-nm laser photocoagulation at the retinotomy edges and subsequent silicone oil tamponade following complete air-fluid exchange. Histopathology (Figure 2A) confirmed a typical choroidal hemangioma (6×7×3.5 mm^3), featuring thin-walled vascular channels filled with erythrocytes.

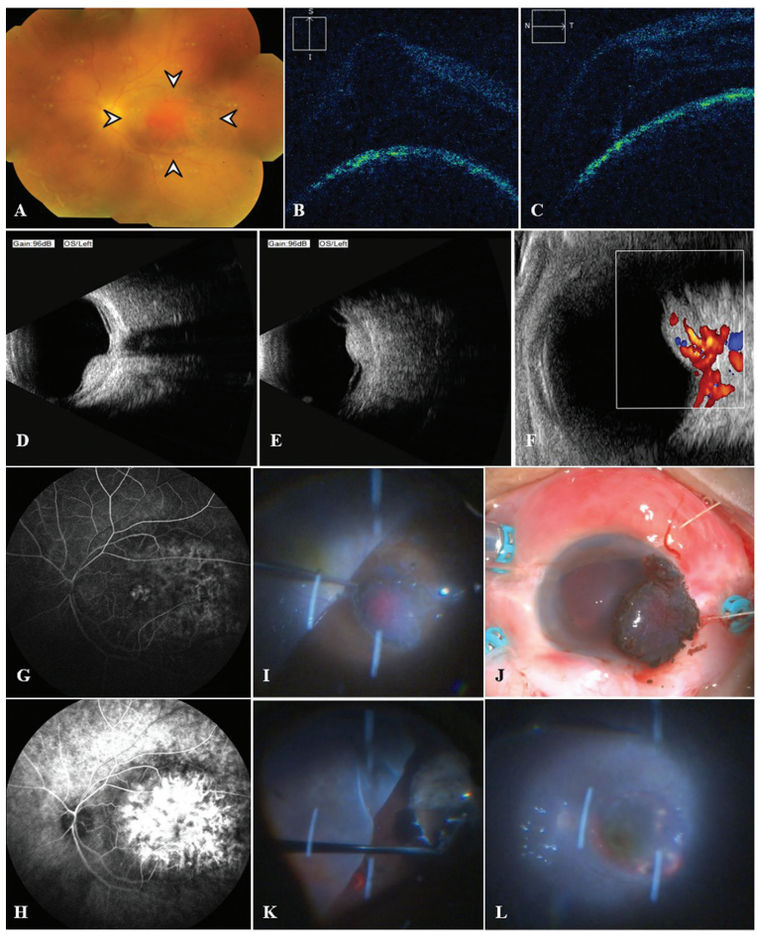

Figure 1 Preoperative examination and intraoperative screenshots A: Fundus photograph, with white arrows indicating the lesion; B–C: Optical coherence tomography; D–E: B-scan ultrasonography; F: Doppler ultrasound; G: Fluorescein angiography; H: Indocyanine green angiography; I–L: Surgical images; I: Coagulation of blood vessels around the tumor and complete resection of the tumor lesion; J: Removal of the tumor *via* corneal incision; K: Harvesting of retinal pigment epithelium-choroid graft from the superotemporal periphery of the lesion; L: After flattening the retina with perfluorocarbon liquid, the choroidal graft is observed through the retina successfully filling the defect. S: Superior; I: Inferior; N: Nasal; T: Temporal; OS: *Oculus sinister*.

At 3-month follow-up, visual acuity improved to counting fingers/50 cm with stable retinal reattachment and revascularization of the graft (Figure 2B–2I). Stable visual acuity was maintained complication-free at 12mo postoperatively.

DISCUSSION

CCH is an uncommon benign vascular hamartoma. Pathologically characterized by fragile vessel walls and hemodynamic instability, CCH may induce vascular leakage leading to subretinal fluid accumulation, exudative RD, and retinal schisis, causing severe visual impairment[1]. However, its benign biological behavior and low prevalence frequently result in clinical under recognition, contributing to diagnostic challenges and lack of standardized treatment strategies[5].

The primary therapeutic objectives for CCH are volume reduction and leakage control to preserve visual acuity. PDT is widely recognized as a first-line therapeutic approach due to its non-invasive nature, proven efficacy, and favorable safety profile[1,5]. However, Mathis *et al*[3]. demonstrated limited PDT efficacy and increased recurrence risk for thick CCH lesions (>3 mm). PDT also shows suboptimal outcomes in cases with extensive RD, while repeated treatments may cause complications including exudative maculopathy, choroidal atrophy, and retinal arteriolar occlusion[4]. Furthermore, the prohibitive cost of PDT agents such as verteporfin (Visudyne®, Switzerland), which are not covered by China's medical insurance, imposes substantial financial burdens on patients and their families. Compounding this issue are persistent manufacturing discontinuations and supply shortages of these medications, resulting in unreliable availability for clinical use. Although proton beam radiotherapy may serve as an alternative for large CCH with extensive RD, its high cost and radiation risks restrict clinical application[3-4]. Moreover, these above therapies may induce psychological distress in some patients due to concerns about incomplete tumor eradication and recurrence risks, potentially compromising both mental

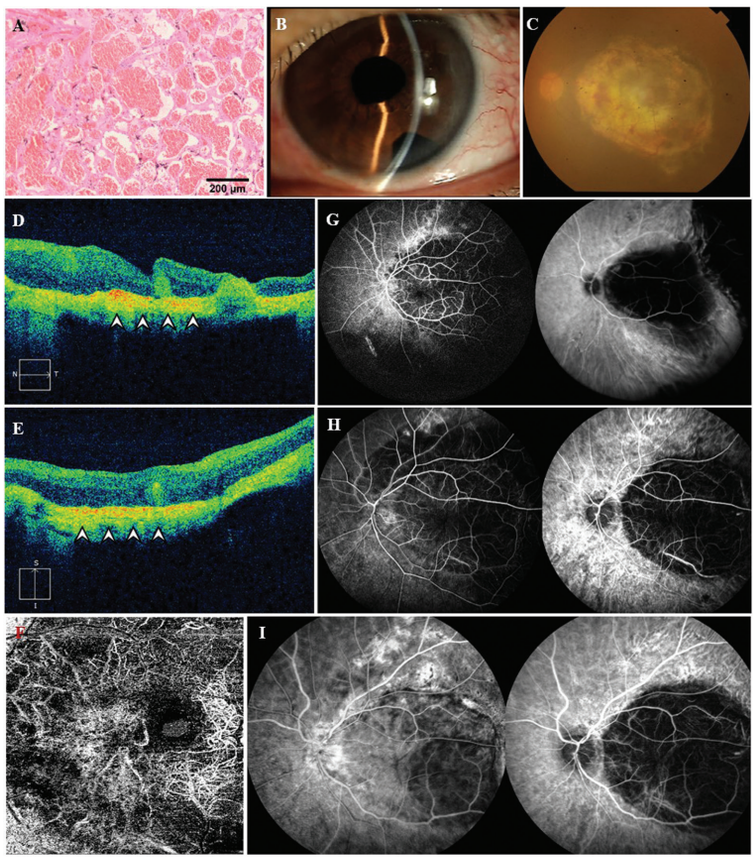

Figure 2 Postoperative follow-up findings A: Postoperative pathology, hematoxylin-eosin staining, scale bar: 200 μm. B: Anterior segment photograph at 3mo postoperatively. C: Fundus photograph at 3mo postoperatively. D–E: Optical coherence tomography at 3mo postoperatively; the white arrow indicates the highly reflective graft. F: Optical coherence tomography angiography at 3mo postoperatively. G: Fluorescein angiography (left) and indocyanine green angiography (right) at 1wk postoperatively. H: Fluorescein angiography (left) and indocyanine green angiography (right) at 1mo postoperatively. I: Fluorescein angiography (left) and indocyanine green angiography (right) at 3mo postoperatively. N: Nasal, T: Temporal, S: Superior, I: Inferior.

wellbeing and treatment adherence. Given these limitations, we evaluated surgical excision for large subfoveal CCH. Complete tumor resection in our case achieved effective leakage control and anatomical retinal reattachment. The radical excision also alleviated psychological distress. Visual acuity progressively improved, reaching optimal correction 3-month after surgery, with no recurrence or proliferative vitreoretinopathy observed during 1-year follow-up.

In this case, phacoemulsification was performed without primary IOL implantation due to the macular CCH's large size and associated RD, which suggested a guarded visual prognosis. Given the unpredictable postoperative course, we prioritized complete tumor resection, exudate reduction, and retinal reattachment, reserving secondary IOL implantation for cases demonstrating significant visual improvement. While complete capsular removal facilitated optimal tumor access, this approach may complicate future IOL placement. For selected cases, posterior capsulotomy with primary IOL implantation using lens blocking techniques could provide adequate surgical exposure while improving IOL stability, representing a potentially favorable alternative that warrants consideration based on individual patient characteristics[6].

Considering the critical role of the RPE-choroid complex in nourishing outer retinal layers, we performed adjunctive autologous RPE-choroid transplantation—a technique first described by Cereda *et al*[7] for wet age-related macular degeneration. In our case, the superotemporal graft successfully repaired the choroidal defect, with revascularization initiating at 1mo and basically completing by 3mo postoperatively. Notably, as full-thickness choroidectomy was performed, neovascularization originated from peripheral choroidal ingrowth rather than residual tissue, potentially prolonging revascularization. Functionally, graft survival maintained macular structural integrity and provided microenvironmental support for neural retina recovery, preventing choroidal coloboma-induced retinal atrophy and complications[8].

To the best of our knowledge, this represents the first documented case of combined CCH excision and RPE-choroid graft transplantation for managing large subfoveal CCH with extensive exudative RD. In this challenging case,

we observed satisfactory anatomical restoration and modest visual improvement following the procedure, suggesting this surgical approach may provide a potential treatment option for select cases. Nevertheless, further investigation through larger case series with extended follow-up periods is required to thoroughly assess the safety, reproducibility, and long-term outcomes of this approach.

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Conflicts of Interest: Huang YK, None; **Huang XG,** None.

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