Scleral resection in chronic central serous chorioretinopathy complicated by exudative retinal detachment

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Abstract

Background: Effective therapeutic options are limited for the management of chronic central serous chorioretinopathy (CSCR) complicated by exudative retinal detachments (RD). The authors describe the resolution of one such case following partial thickness scleral resection with mitomycin C.

Case presentation: This 39-year-old male presented with a unilateral inferior exudative RD in the right eye. There was no history of steroid use either locally or systemically. The fundus fluorescein angiogram showed window defects and leaks typical of chronic CSCR. The axial length was 21.06 mm in the right eye and 21 mm in the left eye. Thickening of the ocular coats was evident on ocular ultrasound. Considering an axial length in the borderline-low range inferotemporal and inferonasal partial thickness scleral resection with mitomycin C was performed. The exudative RD resolved at 4 months.

Conclusion: Partial thickness scleral resection may be considered as an option for treating chronic CSCR patients with borderline-low axial length complicated by exudative RD.

Keywords: Nanophthalmos, Uveal effusion syndrome, Diffuse retinal pigment epitheliopathy, Sclerectomy
CSCR with borderline-low axial length, following partial thickness scleral resection with mitomycin C (MMC).

MMC has been used successfully for its modulatory effects on wound healing in multiple ocular surgeries including trabeculectomy, pterygium excision, keratorefractive surgeries, and sclerectomy for retinal detachment in nanophthalmos [11–13]. In scleral resection, MMC is thought to reduce scarring of the sclerectomy bed and prevent recurrence of the exudative retinal detachment due to the regeneration of thick sclera with abnormally arranged collagen fibers [13]. Reported complications of MMC include hypotony secondary to thin cystic bleb following trabeculectomy, endophthalmitis, and corneal or scleral melting [12]. However, we are unaware of any serious adverse effects of the drug when used in conjunction with sclerectomy for nanophthalmos [12, 14].

**Case presentation**

A 39-year-old male presented with painless progressive diminution of vision in the right eye (RE) of 5 years and in the left eye (LE) of 6 months duration. There was no history of chronic drug use, specifically, use of steroid in any form. The visual acuity was 1/60 (RE) and 6/18 (LE). There was no anterior chamber or retrolental cells in both eyes and intraocular pressures were normal. The RE had a bullous inferior RD involving the macula with a smooth surface and shifting fluid. There was whitish subretinal exudation inferior to the macula (fibrin, Fig. 1a). The LE showed pigmentary changes at the posterior pole and multiple pigment epithelial detachments (PEDs) (Fig. 1b). No mass lesion or peripheral break was detected in either eye. Fluorescein angiography (FA) of the RE showed window defects at the posterior pole with leaks at the nasal part of the window defect and inferonasal to the optic disc (Fig. 1c). There was no disc leak or vasculitis. The LE revealed window defects with multiple PEDs. Optical coherence tomography (OCT) of the RE revealed subfoveal fluid with some underlying hyperreflective material suggestive of fibrin and a serous PED (Fig. 1d). OCT of the LE revealed multiple serous PEDs. The sclero-chorioretinal thickness was 2 mm (RE) and 2.01 mm (LE). Axial lengths were 21.06 mm (RE) and 21 mm (LE). Serum cortisol level, blood pressure,
and kidney functions tests were normal. A diagnosis of bilateral chronic CSCR with an exudative RD in the RE was made. Some cases of CSR can undergo spontaneous resolution. Thus at the first presentation, the patient was advised to follow-up.

At 1 month, there was no change. Then a 2 month trial of oral rifampicin 300 mg twice daily [15] was tried without success. Laser was not considered as the trans-retinal pigment epithelial leakage was not well defined. Though photodynamic therapy (PDT) [6] has been studied extensively for chronic CSCR [16], its role in chronic CSCR complicated by retinal detachment needs evaluation. Our patient was given the option of PDT, but he declined the therapy due to financial constraints. As the exudative RD was not responding and the eye was small in size, we felt that similar to nanophthalmic eyes, the sclera may be the culprit by not allowing the resolution of the subretinal fluid. Thus, we planned partial thickness scleral resection in the RE as the eye was small with increased thickness of the ocular coats like in nanophthalmos. A proper informed consent for the procedure was obtained. Surgically, an area of 4 mm by 3 mm was marked on the sclera, 4 mm posterior to the insertion of recti in inferotemporal and inferonasal quadrants. Using a blade and crescent knife, a partial thickness (more than 50 %) square of sclera was excised from the marked areas. Mitomycin C 0.02 % was placed on the scleral bed for 2 min after which a thorough wash with the balanced salt solution was performed.

At 2 months, the vision of the right eye had improved to 3/60 and the exudative detachment had started regressing. At 4 months, the vision was 6/60 and the exudative detachment had totally resolved (Fig. 2a). OCT revealed resolution of subretinal fluid and marked reduction in the height of the PED with persistence of some of the hyperreflective subretinal fibrin (Fig. 2b).

After 2 years of surgery, the right eye had achieved a best-corrected visual acuity of 6/36. The right eye had attached retina with a focal elevated pigmented area at the fovea surrounded by hypopigmentation (Fig. 2c). OCT showed the absence of subretinal fluid. Few intraretinal cystoid spaces and a subretinal mound presumably due to fibrin were visible (Fig. 2d). The FFA revealed the absence of any active leak and leopard spot like fluorescence in the inferior retina reminiscent of previous retinal detachment (Fig. 2e). The mid-phase indocyanine green angiogram (ICGA) of the right eye was suggestive of DRPE. The foveal center appeared dark, likely due to blocked fluorescence by the focal retinal pigment epithelial hyperplasia as seen on the fundus image. Small pinpoint leaks were visible superior to the disc (Fig. 2f).

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**Fig. 2** The right eye 4 months (**a**, **b**) and 2 years (**c**, **d**, **e**, **f**) after scleral resection. **a** Four months postoperatively, fundus photograph of the right eye shows total resolution of the exudative detachment with persisting diffuse retinal pigment epitheliopathy at the posterior pole. **b** Four months’ follow-up OCT shows resolution of subretinal fluid and marked reduction in height of the PED with persistence of some of the hyperreflective subretinal fibrin. **c** The right fundus 2 years after surgery, revealing retinal pigment epithelial changes and the absence of subretinal fluid at the posterior pole. **d** OCT of the right eye at 2 years after surgery shows the absence of subretinal fluid in the right eye. **e** The FFA revealed a leopard spot like fluorescence inferiorly. **f** The mid-phase ICGA of the right eye showed a block fluorescence at the foveal center and small pin-point leaks superior to the optic disc.
The left eye had retained 6/18 vision and showed RPE changes and subretinal yellowish deposits (Fig. 3a). The OCT showed PEDs temporal to the fovea; and nasal intraretinal cystoid spaces (Fig. 3b). The FFA of the left eye revealed areas of mottled hyper and hypofluorescence with broad areas of staining, but no definitive focal leak could be identified (Fig. 3c). ICGA (early phase) of the left eye showed patchy granular fluorescence at the posterior pole, and dilated large choroidal vessels inferior to the fovea (Fig. 3d). Diffusely increased choroidal hyperfluorescence around this region at the posterior pole persisting in the late phase, suggestive of increased choroidal permeability was also seen. In the mid phase, few active pin point leaks were also evident (black arrowhead, Fig. 3e).

**Conclusions**

Causes of exudative RD include hypertension [17], Vogt-Koyanagi-Harada syndrome, posterior scleritis, metastasis, uveal effusion syndrome, nanophthalmos and other ocular tumors. In our patient, blood pressure was normal and there was no evidence of intraocular inflammation. Our patient did not have pain and subtenon fluid on ultrasound typical of posterior scleritis. Ocular tumor or metastasis was ruled out by indirect ophthalmoscopy and ocular ultrasound.

Uveal effusion syndrome was ruled out as there was no ciliochoroidal detachment. The most important differentials in our case included chronic CSCR [1] and serous RD secondary to nanophthalmos [18]. Considering the clinical picture, fluorescein angiography and OCT findings, our primary diagnosis was chronic CSCR. The eye of our patient was not nanophthalmic by strict diagnostic criterion (axial length < 20 mm) [19], but it was still a small eye with borderline axial length. The thickness of the ocular coats was also increased. Thus, we hypothesized that additionally in our patient there may be a component of reduced transscleral outflow that is seen in nanophthalmic eyes. This reduced outflow was probably unable to balance the marked exudative inflow due to chronic CSCR and resulted in a persistent exudative RD.

We have previously demonstrated the benefit of partial thickness scleral resection with mitomycin C in nanophthalmic eyes with exudative RD [12]. A similar procedure was carried out in our patient. However, chronic CSCR with exudative RD may also resolve spontaneously [2]. Yet a slow but dramatic resolution of the subretinal fluid and improvement of visual acuity of our
patient after this particular intervention suggests that the surgery was contributing to the resolution of the detachment. We hypothesize that smaller eyes with compromised transscleral outflow may be at higher risk of developing large exudative RDs in the presence of other pathologies like chronic CSCR. These eyes may benefit from partial thickness scleral resection surgery to improve transscleral outflow. The limitation of our hypothesis is that it is based upon a single case report and we do not have long-term results after the surgery. Larger case series with similar ocular parameters and longer follow-up are required to further elaborate the role of such procedures.

Abbreviations
CSCR, Central serous chorioretinopathy; DRPE, Diffuse retinal pigment epitheliopathy; ICGA, Indocyanine green angiogram; LE, Left eye; MMC, Mitomycin C; OCT, Optical coherence tomography; PDT, Photodynamic therapy; PED, Pigment epithelial detachments; RD, Retinal detachment; RE, Right eye; RPE, Retinal pigment epithelium; UES, Uveal effusion syndrome

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Authors’ contributions
RC and PV had full access to all of the data in the study and took responsibility for the integrity of the data and the accuracy of the manuscript. KT, RB, and HIS collected the clinical details. All authors analyzed, interpreted the clinical features, drafted the manuscript, and critically revised the paper for intellectual content. All authors read and approved the final manuscript.

Competing interests
The authors declare that they have no competing interests.

Ethics approval and consent to participate
Patient consent was obtained for the publication. The research adhered to the tenets of the Declaration of Helsinki.

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