

Why Do Choroidals Form, and How Do You Treat Them?

BY MALIK Y. KAHOOK, MD, AND ROBERT J. NOECKER, MD, MBA

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Choroidals or choroidal effusions are typically encountered during the postoperative period, most commonly after glaucoma surgery or another condition that has resulted in hypotony. Choroidals themselves are not necessarily vision threatening, and they tend to have a self-limited course, as long as their underlying cause has been resolved. They are usually considered a surgical complication, however, and can result in at least temporarily decreased vision. Physicians must be able to differentiate choroidal effusions from suprachoroidal hemorrhages, which are much more serious and more likely to result in a permanent loss of vision.

Clinicians will almost always see choroidals in the setting of inflammation and some degree of relative hypotony. They can occur after all types of laser procedures in both the anterior and posterior segment. Choroidals occasionally occur after the use of topical and systemic medications such as sulfa drugs or prostaglandin analogs.¹ Incisional surgery, however, is the most frequent cause, especially procedures in which the IOP is lowered markedly from its preoperative level. Other risk factors for postoperative choroidals include hypertension, older age, prior vitrectomy, nanophthalmos, and elevated episcleral venous pressure as seen in Sturge-Weber syndrome and related conditions.²

FORMATION

Choroidals form when serum or blood accumulates in the suprachoroidal space between the choroid and sclera. Clinically, they may be either serous or hemorrhagic, depending on the characteristics of the fluid contained between the tissue planes. Serous choroidals form due to

serum's transudation into the suprachoroidal space, a process often related to increased transmurial pressure associated with hypotony or trauma. Typically, fluid pools in the suprachoroidal space due to inflammatory conditions following surgery, but its accumulation can also be the first sign of a previously undiagnosed disease such as posterior scleritis.³

Hemorrhagic choroidals form when the choroidal vessels that traverse the posterior sclera rupture. The initiating event is usually a sudden decrease in IOP during penetrating ocular surgery, but this pathologic condition can also occur after blunt trauma. In rare instances, hemorrhagic choroidal detachments occur spontaneously. Predisposing factors for the condition include older age, a history of glaucoma, previous ocular surgery (especially in aphakic eyes), and either a long or very short axial length.

DIAGNOSIS

Clinicians diagnose choroidals by their characteristic appearance during the slit-lamp examination and/or funduscopy. Slit-lamp biomicroscopy tends to reveal a shallow anterior chamber if the choroidal detachments are large or very anterior in relation to the ciliary body. With smaller choroidals, there may be only a narrowing of the peripheral chamber and angles.

The differential diagnosis of choroidals in the postoperative setting includes malignant glaucoma (aqueous misdirection syndrome) and overfiltration with hypotony from a leak or other causes. Typically, aqueous misdirection syndrome is associated with a progressive shallowing of the anterior chamber accompanied by increasing IOP in the absence of choroidals. Although choroidals may exist without overfiltration, fixing the underlying cause of hypotony may prevent their occurrence.

Patients' vision may or may not be affected when a

choroidal forms, depending on its size and location. Patients may complain of sudden pain and visual loss, whereas others will be asymptomatic. Some effusions may be very low and peripherally located and will only be diagnosed with ultrasound. Others can be strikingly large and may be readily visible at the slit lamp. The IOP is often low in cases of serous choroidal detachments, but it is frequently high for a prolonged period after the formation of hemorrhagic detachments.

If large, choroidals may extend across the macula and cause a severe decrease in acuity. In the long term, associated posterior segment pathology such as serous retinal detachments, cystoid macular edema, and vitreous hemorrhage may also limit vision. Fundoscopy usually reveals dome-shaped elevations in the posterior segment that are limited in area by the fibrous adhesions concurrent with the vortex veins. They are usually brown, with darker ones more likely to be hemorrhagic. These features allow the clinician to distinguish between choroidal and retinal detachments, the latter of which are not limited by the anatomy of vortex veins. As fluid accumulates, choroidal detachments grow by rising off the sclera into the vitreous cavity. In more severe cases, choroidals from opposite sides of the eye may touch (termed *kissing choroidals*), a situation that requires close observation and early surgery to prevent vitreous adhesions and eventual retinal detachments.

In cases in which the diagnosis is not clear or if the choroidals are anterior or relatively close to the anterior segment, ultrasound biomicroscopy can help. B-scan ultrasonography will reveal dome-shaped elevations of the choroid that do not cross from quadrant to quadrant (Figure 1) and that often have an hourglass configuration, unlike retinal detachments, which are frequently mobile. High-resolution ultrasound biomicroscopy can delineate anterior choroidal detachments and may also assist clinicians in identifying associated traumatic ciliary body clefts, if present.⁴

TREATMENT

Pharmacologic Agents

Fortunately, most choroidal effusions resolve on their own, especially if the IOP increases. Typically, we expect to see resolution within 2 weeks if the initial conditions associated with the choroidals' development have been corrected. Patients with serous or hemorrhagic choroidal detachments generally benefit from high doses of topical steroids and cycloplegic agents. As a starting point, we usually prescribe atropine 1% eye drops q.i.d. and prednisolone acetate q.i.d.

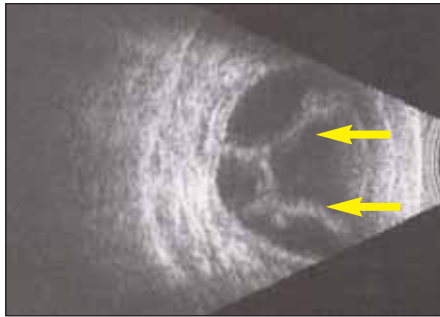


Figure 1. Choroidal detachments (arrows) are visible after pars plana vitrectomy in a patient with high myopia and hypertension.

as postoperative prevention or until there is resolution. In the acute phase, when a transient elevation in IOP may occur due to the mass effect of the effusion, we usually administer beta blockers, alpha agonists, and topical carbonic anhydrase inhibitors and then withdraw them as the pressure decreases. In cases of persistent serous choroidals associated with inflammation, systemic steroids may be indicated.

If patients with hemorrhagic choroidals have elevated IOP, they

should receive pressure-lowering medications in the usual dosing patterns until their IOP normalizes, which can take a fair amount of time. Because these eyes tend to exhibit greater inflammation, they may require more intense anti-inflammatory therapy.

Surgery

Injecting a viscoelastic with dispersive properties such as Healon 5 (Advanced Medical Optics, Inc., Santa Ana, CA) into the anterior chamber may help in cases of persistent hypotony with serous choroidals and shallow anterior chambers. The volume injected depends upon the degree of hypotony and is guided by postinjection checks of the IOP. Upon the subsequent increase in IOP, the cycle of continuing effusion into the suprachoroidal space is reduced, and the absorption of serous fluid is enhanced. Additionally, if the anterior chamber is shallow and iris/cornea or lens/cornea touch is present, the viscoelastic will deepen the chamber, decrease the dysfunction of the corneal endothelial cells, and slow their death. Depending on the rate of the viscoelastic's resorption and the stability of the IOP, serial injections may be indicated.

Surgeons should administer the injections to a sterile ocular surface after instilling povidone iodine and a fourth-generation fluoroquinolone. They should check the IOP immediately after the injection to ensure that too much of the viscoelastic has not been placed, which could cause a harmful spike in IOP.

If medical and office-based therapy proves ineffective, surgical intervention may be indicated. The reasons for surgery include a flat anterior chamber, overly slow resolution, inadequately controlled IOP, and a concern about permanent visual loss from the location of the retina in relation to other intraocular structures. The decision to intervene is controversial in cases of hemorrhagic choroidal detachments. The surgical timing and technique vary among physicians with no foolproof approach to every patient. Traditionally, surgery should not occur until after autolysis

of the clot so that drainage is easier and more complete (approximately 7 to 10 days). Some surgeons argue that earlier intervention, with or without vitrectomy and intraocular gas, produces superior visual outcomes.⁵

After deciding that drainage is necessary, surgeons make incisions 5 to 8 mm posterior to the limbus in the areas where the choroidal detachments are most prominent. The incisions are circumferential and approximately 2 mm long. The surgeons then pressurize the eye from within, often with an anterior chamber maintainer. They make a stab incision into the suprachoroidal space and allow the fluid to drain. The incisions are often left open after surgery to encourage the continued drainage of fluid during the postoperative period. The most frequent complication is an inability to achieve adequate drainage.

CONCLUSION

Those performing glaucoma surgery will inevitably encounter choroidals. Prophylaxis with cycloplegics and steroids and the avoidance of hypotony are helpful but not foolproof. Anticipating and recognizing the problem can achieve good outcomes in many cases, with the choroidals' occurrence just a bump in the road to patients' postoperative recovery. □

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