



Anterior Segment Ischemia Following Pterygium Surgery

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Abstract: A 60-year-old woman developed anterior segment ischemia 1 week after an uneventful pterygium excision in the left eye. Corrected visual acuity fell from 20/20 to 20/200. Ophthalmic examination found keratic precipitates on the corneal endothelium, ++ cells in the aqueous humor, and necrosis of the lower half of the iris with posterior synechiae resulting in a fixed and distorted pupil. On therapy of topical corticosteroid eyedrops hourly and atropine eyedrops three times a day, the iridocyclitis resolved in 2 weeks. At the final examination 3 months after the surgery, the corrected visual acuity was 20/20. The atrophy of the lower half of the iris and posterior synechiae in the lower half of the pupil, giving the fixed and distorted pupil, were noted as sequelae. Iris fluorescein angiography revealed filling defects in the lower half of the iris but no leakage from iris vessels. Systemic evaluation was unremarkable except for mild hypertension. Doppler studies of carotid, ophthalmic, and central retinal arteries were normal. Mitomycin C, β -irradiation and rectus muscle fixation sutures were not used. Only conjunctival dissection or episcleral cauterization were seen as possible causes of interference with the anterior segment blood supply. We believe this is the first report of anterior segment ischemia following pterygium surgery. *Jpn J Ophthalmol* 1997; **41:192-195** © 1997 Japanese Ophthalmological Society

Key Words: Anterior segment ischemia, pterygium, surgery.

Introduction

Anterior segment ischemia is seen only rarely after strabismus surgery. It has occurred following retinal reattachment, especially in patients with hemoglobinopathy or occlusive vascular diseases¹; in association with aortic arch syndrome,² carotid-cavernous fistulae,³ acute angle-closure glaucoma,⁴ herpes simplex and herpes zoster ophthalmicus,^{5,6} and irradiation.⁵ Watson⁷ has recently described an occurrence of anterior segment ischemia following trabeculectomy under local anesthesia.

This report describes anterior segment ischemia that developed in a 60-year-old woman after an uncomplicated pterygium surgery.

Case Report

A 60-year-old woman came to our clinic with a complaint of left pterygium; visual acuities were 20/20

(right) and 20/40 (left). Autorefractometry was +1.25 (left) with corrected visual acuity of 20/20. Anterior segment examination found a nasal pterygium in the left eye and bilateral beginning nuclear sclerosis. The vitreous, optic discs, maculae, peripheral retinae, and intraocular pressures were normal. There was mild generalized and focal constriction of the retinal arterioles and broadening of the arteriolar light reflex, but no arteriovenous crossing changes.

Surgery was done under local anesthesia (1 mL lidocaine 2% with 1/100 000 epinephrine): Conjunctival overgrowth on the cornea was stripped and the body of the pterygium was excised. Following cauterization of the episclera, the conjunctiva was closed with 2 6/0 vicryl sutures. One week later, the patient returned complaining of pain and loss of visual acuity in the left eye. Corrected visual acuity was 20/200; keratic precipitates were present on the corneal endothelium, there were ++ cells in the aqueous humor, and there was necrosis of the lower half of the iris with posterior synechiae. There was no evidence of keratitis, epithelial edema, or stromal lesion of Descemet's membrane foldings. The vitre-

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Figure 1. Anterior segment photograph showing the small corneal opacity near the nasal limbus corresponding to where the pterygium was adherent before the operation. Note atrophy in the lower half of the iris and posterior synechiae in the lower half of the pupilla resulting in a fixed and distorted pupil.

ous, optic disc, and retina were unremarkable. Intraocular pressure was normal. Treatment with topical corticosteroid eyedrops hourly and atropine eyedrops three times a day was begun and the iridocyclitis resolved within 2 weeks.

The clinical findings indicated a diagnosis of anterior segment ischemia. A thorough examination for systemic abnormalities was done. The systemic blood pressure was about 160/100 mm Hg, consistently above 140/90 mm Hg. The physical examination, complete blood count, urinalysis, erythrocyte sedimentation rate, serum chemistries, electrocardiogram, serum protein electrophoresis, hemoglobin electrophoresis, C3 and C4 complement levels, antinuclear antibody, single and double-stranded DNA, antineutrophil cytoplasmic antibody, prothrombin time, partial thromboplastin time, fibrinogen, protein C, circulating immune complex, anticardiolipin antibody, and syphilis serology results were unremarkable. Doppler studies revealed normal carotid, ophthalmic, and central retinal arteries bilaterally.

At the final examination 3 months postoperatively, there was no active intraocular inflammation.

Corrected visual acuity was 20/20. There was a small corneal opacity near the nasal limbus corresponding to the pterygium attachment site (Figure 1). There were pigmented keratic precipitates on the corneal endothelium, atrophy of the lower half of the iris and posterior synechiae in the lower half of the pupil resulting in a fixed and distorted pupil (Figure 1). Iris fluorescein angiography revealed filling defects in the lower half of the iris but no leakage from iris vessels.

Discussion

Blood is supplied to the anterior segment of the eye by the anterior ciliary arteries and the long posterior ciliary arteries. These originate from the ophthalmic artery, which in turn arises from the internal carotid artery. About 70–80% of the anterior segment blood supply is provided by the anterior ciliary arteries.⁸ Hayreh⁹ has shown that, in monkeys, the long posterior ciliary arteries are not required for normal blood supply to the anterior segment but, when the anterior ciliary arteries were severed, iris

filling defects were seen in the superior and inferior quadrants. The nasal and temporal portions of the iris did not show filling defects because they are supplied by the long posterior ciliary arteries as well.^{10,11}

Several collateral circulations in the anterior segment have been described. The most important of these is the perilimbal circulation, which includes vascular networks in the conjunctiva, Tenon's capsule, and episclera. Most of the blood supply to these structures comes from the anterior ciliary artery.^{12,13} The perilimbal circulation is an important collateral link between adjacent anterior ciliary arteries. Preservation of this perilimbal circulation may also provide some degree of protection against anterior segment ischemia in cases of surgery involving three and four muscles.

Anterior segment ischemia has been reported in association with almost every strabismus procedure except that involving a single rectus muscle. Those involving three and four muscles carry the greatest risk; children usually tolerate such procedures without difficulty while adults have a greater risk. Patients with poor blood flow also have an increased risk of anterior segment ischemia.^{14,15} Vertical rectus muscle procedures result in greater reduction of the anterior segment blood supply.¹⁶ Systemic factors leading to thromboembolic, inflammatory, or infectious arterial diseases may contribute to the development of postoperative anterior segment ischemia in adults.¹⁷ The patient in this report had no systemic abnormality except for mild hypertension and Doppler studies found no abnormalities.

Anterior segment ischemia may occur within 1-7 days of surgery, but is most common in the first 24-48 hours. Milder forms occur with only anterior chamber cells and flare, with filling defects seen on iris fluorescein angiography. These changes tend to resolve within 1-2 days without permanent sequelae. More severe forms are seen with anterior uveitis, posterior synechiae, and keratitis, leading to permanent sequelae such as iris atrophy, fixed and distorted pupil, peripheral anterior synechiae, neovascularization of the cornea and iris, cataract, hypotony, and phthisis. The disease is more protracted in the more severe forms, often lasting more than 2 months.¹⁶

In our patient, the iridocyclitis began 7 days postoperatively and resolved in 2 weeks in response to treatment with topical corticosteroids and atropine. Corrected visual acuity returned to 20/20. Complications were iris atrophy and posterior synechiae, and iris fluorescein angiography 3 months postoperatively revealed filling defects in the lower half of the

iris. This patient had a mild form of the disease and left permanent, but not serious, sequelae.

Watson⁷ described an occurrence of anterior segment ischemia following trabeculectomy that was complicated by intraoperative systemic hypotension leading to vascular decompensation, ocular hypotony, and serious complications including choroidal detachment and iris. Watson⁷ postulated that damage to the anterior episcleral arterial circle (AEAC) during scleral flap preparation might also have contributed to the development of the anterior segment ischemia.

In our present case, the pterygium excision was uneventful, and there were no intraoperative hypotensive difficulties: none of the factors described by Watson. We did not use mitomycin C, β -irradiation, or fixation sutures. The only factors that might be implicated were the conjunctival dissection and episcleral cauterization. There was, therefore, only limited, if any, interference with the blood supply to the anterior segment of the eye. We consider this case interesting because it is the first report of anterior segment ischemia following pterygium surgery.

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