

INTRACAMERAL STREPTOKINASE TO TREAT SEVERE PUPILLARY FIBRIN MEMBRANE AFTER PARTIAL PENETRATING KERATOPLASTY⁺

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In an eye that has undergone partial penetrating keratoplasty (PPK) due to central corneal opacity and vascularization due to herpetic stromal keratitis, an excessive pupillary fibrin membrane developed postoperatively. Since there was no regression in the pupillary membrane during four days follow-up period, streptokinase was injected into the anterior chamber and the pupillary fibrin membrane resolved totally in two days. In this case report, the efficacy of streptokinase in the treatment of refractory pupillary fibrin membrane is discussed.

Key words: Partial penetrating keratoplasty, Pupillary fibrin membrane, Streptokinase

Parsiyel Penetran Keratoplasti Sonrası Gelişen Pupiller Membranın Tedavisinde İntrakameral Streptokinaz Uygulaması

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Herpetik stromal keratit nedeniyle korneal kesafet ve damarlanması olan bir göze parsiyel penetran keratoplasti uygulanmış ve bu işlemi takiben postoperatif erken dönemde şiddetli bir pupiller membran gelişmiştir. Pupiller membranın medikal tedaviye yanıt vermemesi nedeniyle, postoperatif dördüncü günde ön kameraya streptokinaz uygulanmış ve iki gün içerisinde pupiller membran bütünüyle düzelmiştir. Bu yazıda, dirençli pupiller membran tedavisinde streptokinazın etkinliği ele alınmıştır.

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Pupillary fibrinoid reaction is an inflammation characterized by the accumulation of fibrin in the pupil in the early postoperative period following partial penetrating keratoplasty (PPK).¹ If not treated properly, it may lead to the development of anterior synechia, posterior synechia, pupillary block and increased intraocular pressure.¹⁻³ The classical treatment of this complication is usually done with topical and periorbital application of steroids and in resistant cases with systemic steroids.^{4,5} In some of the resistant cases that do not respond to these classical treatment modalities or in cases that need early and prompt treatment, e.g. pupillary block and increased intraocular pressure, surgeons try to solve the problem surgically and this method may lead to increased complications, especially in the phakic eyes.^{6,7} Tissue plasminogen activator administration was found to be effective in clinical studies, but due to cost and availability, it is not being used routinely.^{4,8-10} Streptokinase has been used as a fibrinolytic agent in coronary arterial occlusions and deep venous and arterial thrombosis for a long time.^{5,11}

In our case, pupillary fibrinous membrane that developed after PPK led to the development of seclusio pupilla, pupillary block and increased intraocular pressure. Injection of streptokinase into the anterior chamber cleared the fibrin clot and eased the resolution of posterior synechia and pupillary membrane without any complication.

CASE

A 15 year-old girl was referred to our hospital with herpetic keratitis sequela and vascularized leucoma in the right eye. Initial ophthalmologic examination demonstrated a visual acuity in the right eye that was counting fingers at 2 m. Intraocular pressure (IOP) was in the normal range. Visual acuity in the left eye was 20/20 and IOP was in the normal range. Slit-lamp

examination showed central corneal opacity and vascularization due to herpetic stromal keratitis. Anterior chamber, iris, lens and fundus of the right eye was normal. B-mode ultrasonography of the right eye showed no pathology. Ophthalmologic examination of the left eye was also normal. The patient had no systemic illness.

The patient underwent an uncomplicated partial penetrating keratoplasty (PPK) under general anesthesia. The operation was concluded with subconjunctival injection of gentamycin and dexamethasone. At postoperative third hour, the cornea was moderately swollen, the anterior chamber was deep enough and the intraocular pressure was increased slightly with the Goldmann applanation tonometer. The pupil was not reactive and there was pupillary fibrinous membrane formation.

On postoperative first day, visual acuity was counting fingers at 3 m, IOP was increased, corneal sutures were intact, cornea was moderately edematous, anterior chamber was flat, pupillary membrane was increased and seclusio pupilla and pupillary block were present secondary to membrane. The patient was reoperated. Peripheral iridectomy and anterior chamber irrigation were performed under general anesthesia. Excessive topical steroid eyedrops, antiglaucomatous agents, antibiotics and oral acetazolamide treatment were given. On postoperative second day, visual acuity was counting fingers at 3 m, corneal edema was going on, anterior chamber was deep, peripheral iridectomy was potent, pupillary membrane was continuing, pupilla was nonreactive and IOP was still slightly increased. On postoperative third day, in spite of the treatment, there was no change in the other signs except a decrease in corneal edema. On postoperative fourth day, corneal edema was minimal but pupillary membrane and seclusio pupilla had not regressed (Figure 1). Intraocular pressure was in the normal range with antiglaucomatous medications. Visual acuity

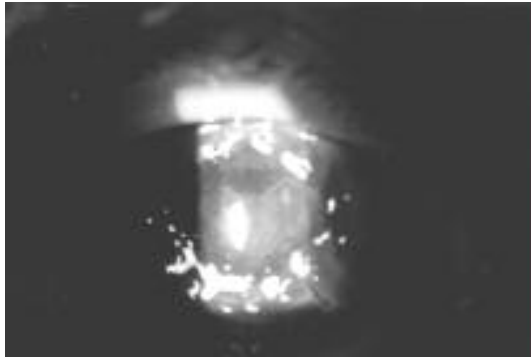


Figure 1. On postoperative fourth day, photograph of the anterior segment of the right eye shows pupillary fibrin membrane, seclusio pupilla and minimal corneal edema.

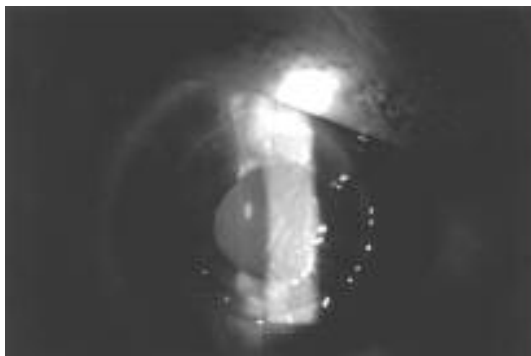


Figure 2. This photograph shows clear cornea and disappeared pupillary fibrin membrane on second day after intracameral streptokinase injection.

was still counting fingers at 3 m. The patient was taken to the operating room again and under topical anesthesia, 2000 IU/0.1 ml streptokinase was injected into the anterior chamber. After 4 hours, membrane started to resolve from upper and lower margins of pupilla. Medical treatment of patient was not changed. Two days after streptokinase injection, corneal edema was nearly absent, membrane totally disappeared and pupilla was reactive again (Figure 2). Visual acuity was 20/200. No systemic or ocular complication of streptokinase injection (e.g. hyphema etc) was detected. Antiglaucomatous medication was stopped and topical steroid treatment was reduced. Visual acuity was 20/100 on ninth day, 20/40 at one month, 20/30 at

two months and 20/20 at three years. The patient is still being followed by our clinics (Figures 1-2).

DISCUSSION

PPK is performed widely for optic, therapeutic and cosmetic purposes.⁷ Blood-aqueous barrier impairment and immunological mechanisms were thought to be responsible for inflammatory fibrinoid reactions.^{10,11} One of the mostly seen clinical manifestations of these reactions is pupillary fibrin membrane formation in the early postoperative period. It usually responds well to topical, peribulbar and systemic steroid administration. However, sometimes it may lead to the development of posterior synechia, pupil irregularities, pupillary block and IOP increase, which all are frustrating conditions both for the physician and the patient.^{3-5,11}

Streptokinase is produced by Group C beta hemolytic streptococcus.^{5,11,12} It converts plasminogen into the plasmin which degrades fibrin.^{5,11,12} Specular microscopy studies revealed that injection of streptokinase into the anterior chamber did not cause any significant loss of endothelium.^{5,11,12} Since we do not have specular microscope in our clinic, we were not able to evaluate whether there was loss of endothelium or not. But there was no corneal thickening or increase in edema after the streptokinase injection. Although some authors have reported hyphema as a complication of streptokinase injection into the anterior chamber, hyphema did not develop in our case.^{5,11,12} We also did not see complications like cataract during one year follow-up period.

Cherfan et al. who studied the effects of streptokinase injection into the anterior chamber in cases of fibrin reaction after vitrectomy reported that there was a complete resolution of fibrinoid membrane in all of nine patients within 4 hours.⁵ They reported no complications except one case

with hyphema.⁵ Mullaney et al. reported a series of eight children with fibrinous membranes after lens extraction and lens implantation.¹¹ They reported that after streptokinase injection into the anterior chamber for the treatment of pseudophacic fibrinous exudate, none of those cases had presented with any complication.¹¹ Akkın et al. used streptokinase injection (1000 IU/0.1 ml) into the anterior chamber of eight patients for the treatment of pseudophacic fibrinoid reaction which developed after cataract extraction.¹² They reported a complete resolution of pupillary fibrinoid membrane in seven (87.5 %) of the eight patients within one hour to five days without corneal edema or hyphema.¹²

In conclusion, if there is development of unwanted conditions like pupillary membranes after PPK and if surgical intervention is limited or ineffective especially in phakic patients or there is no response to the medical treatment, streptokinase injection into the anterior chamber may be considered as a solution of all those problems without any harm to

the lens.

REFERENCES

1. Nishi O, Nishi K. Fibrin reaction after posterior chamber lens implantation. *Eur J Ref Sur* 1992; 40: 73-96.
2. Spitznas M, Werdermann D, Böker T. Fibrinous reaction occurs until 8 days after intraocular lens implantation (letter). *Arch Ophthalmol* 1990; 108: 1666.
3. Miyake K, Maekubo K, Miyake Y, Nishi O. Pupillary fibrin membrane: A frequent early complication after posterior chamber lens implantation. *Japan Ophthalmology* 1989; 96: 1228-33.
4. Johnson RN, Blankenship GA. Prospective, randomized, clinical trial of heparin therapy for postoperative intraocular fibrin. *Ophthalmology* 1988; 95: 312-7.
5. Cherfan GM, Maghraby AE, Tabbara KF, Nasr Y, Hassan H. Dissolution of intraocular fibrinous exudate by streptokinase. *Ophthalmology* 1991; 98:870-4.
6. Miyake K. The significance of inflammatory reactions following cataract extraction and intraocular lens implantation. *J Cataract Refract Surg* 1996; 22 supplement:759-63.
7. Snyder RW, Sherman MD, Allinson RW. Intracameral tissue plasminogen activator for treatment of excessive fibrin response after penetrating keratoplasty. *Am J Ophthalmol* 1990; 109: 483-4.
8. Boldt HC, Abrahams GW, Murray TG, Han DP, Mieller WF. The lowest effective dose of tissue plasminogen activator for fibrinolysis of postvitrectomy fibrin. *Retina* 1992; 12: 75-9.
9. William GA, Lambrou FH, Jaffe GH. Treatment of postvitrectomy fibrin formation with intraocular tissue plasminogen activator. *Arch Ophthalmol* 1988; 106: 1055-8.
10. Klais CM, Hattenbach LO, Steinkamp GWK, Zubcov AA, Kohnen T. Intraocular recombinant tissue-plasminogen activator fibrinolysis of fibrin formation after cataract surgery in children. *J Cataract Refract Surg* 1999; 25: 357-62.
11. Mullaney PB, Wheeler DT, Al Nahdi T. Dissolution of pseudophacic fibrinous exudate with intraocular streptokinase. *Eye* 1996; 10: 362-6.
12. Akkın C, Menteş J, Kaşkaloğlu M, Erbakan G, Köse S. İntracameral streptokinaz enjeksiyonunun psödo-fakik fibrinoid membranlı gözdeki terapötik etkisi. *T Oft Gaz* 1994; 24: 347-2.