

Intracameral Injection of Methotrexate for Treatment of Epithelial Ingrowth

Farhad Salari¹, Ghasem Fakhraie¹, Fahimeh Asadi Amoli¹, Mehran Zarei-Ghanavati¹

¹Department of Cornea, Farabi Eye Hospital, Tehran University of Medical Sciences, Tehran, Iran

Abstract

Purpose: To report a case of intracameral injection of methotrexate (MTX) to treat the epithelial ingrowth that occurred following glaucoma surgery.

Methods: A case report of a 40-year-old male with epithelial ingrowth after implantation of Ahmed glaucoma valve.

Results: The patient was treated with 11 doses of weekly intracameral MTX (400 mg/0.1 ml). Clinical evidence of recurrence was not observed after 11 months of follow-up.

Discussion: Intracameral MTX can be used as an alternative for the treatment of epithelial ingrowth.

Keywords: Epithelial ingrowth, Glaucoma valve, Intracameral, Methotrexate

Address for correspondence: Mehran Zarei-Ghanavati, Farabi Eye Hospital, Qazvin Square, Tehran, Iran.

E-mail: mehran_zarei@yahoo.com

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INTRODUCTION

Epithelial ingrowth is characterized by corneal epithelial cells' growth into the anterior chamber of the eye and may occur after various surgeries, including keratoplasty,¹ cataract surgery,² and glaucoma surgeries like Ahmed valve implantation.³ Many strategies have been proposed to treat this condition, such as surgery or intravitreal injection of different medications, including intracameral injection of 5-fluorouracil and methotrexate (MTX).^{4,5} Herein, we report a case of intracameral injection of MTX for the treatment of epithelial ingrowth.

CASE REPORT

A 40-year-old male with a history of retinitis pigmentosa and advanced glaucoma in both eyes was referred for the evaluation of low visual acuity. He had undergone Ahmed valve shunt surgery and lens extraction in the left eye before

presenting to our clinic. Furthermore, the patient had a history of vitrectomy and lens extraction for treatment of retinal detachment after trauma in the right eye. On examination, the visual acuity was counting fingers at 1 meter in the right eye and hand motion in the left eye. The intraocular pressure was 21 mmHg in the right eye and 16 mmHg in the left. The patient was on timolol and brimonidine eye drops every 12 h. On slit-lamp biomicroscopy, band keratopathy and partial corneal edema on the left cornea was observed. In May 2019, a superficial keratectomy was performed in the left eye to remove band keratopathy. The vision improved postoperatively to counting fingers at 1 m. However, he presented with a reduced visual acuity due to increased diffuse corneal edema. Therefore, Descemet-stripping automated endothelial keratoplasty (DSAEK) surgery was done in July 2019. Descemet's membrane was sent for pathological examination and a diagnosis of epithelial ingrowth was confirmed [Figure 1a and b]. The surgery was uneventful, and

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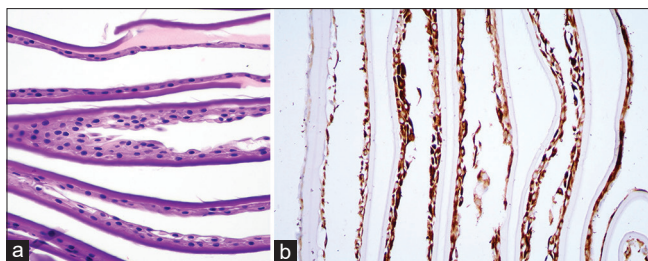


Figure 1: (a) Histological staining of retrocorneal lesion. Epithelialization of endothelial cells, which show replacement of normal endothelial cells with larger hexagonal epithelial type cells with hematoxylin and eosin. (b) Immunohistochemistry staining of epithelial cells (positive pan-cytokeratin marker)

the visual acuity increased to counting fingers at 1 m again a week after surgery. A retrocorneal membrane with a defined border covering the peripheral corneal endothelium was noted on a slit-lamp examination [Figure 2a]. It progressed centripetally to nearly half of DSAEK lenticule for several months. In December 2019, he received intracameral MTX (400 mg/0.1 ml) every week for seven doses until the resolution of ingrowth was detected on examination. The injections were stopped, but regrowth was noted after a month. Four weekly injections were done to suppress the lesion completely. Eleven months after his last injection, there was no recurrence, but his vision was HM [Figure 2b]. The decrease in vision was probably due to deterioration in optical disk function because cornea and macula examination did not change during follow-up. The consent form was obtained from the patient.

DISCUSSION

Epithelial ingrowth is an uncommon complication of intraocular surgeries and is characterized by the proliferation of corneal epithelial cells through the anterior segment of the eye. This complication has been reported following all types of anterior segment surgery.¹⁻³ Several mechanisms have been proposed for the etiology of epithelial ingrowth after shunt implantation. It is presumed that epithelial ingrowth following glaucoma drainage device implantation may result from the migration of epithelial cells through the drainage tube to the anterior chamber⁶ or the introduction of epithelial cells from surgical incisions.⁷ Many strategies have been proposed for the management of epithelial ingrowth, including irradiation, cryotherapy, laser photocoagulation, or surgical removal.⁸ If it occurs after DSAEK, penetrating keratoplasty, repeat DSAEK, or more conservative approaches such as observation have been used.¹

This article reported a case of successful treatment of epithelial ingrowth with intracameral MTX. MTX is an antimetabolite agent that works by inhibiting dihydrofolate reductase in cells. The safety and efficacy of intraocular injection of MTX in the treatment of ocular disorders such as vitreoretinal lymphoma has been shown in many studies.⁹ Recently, MTX is proposed for the treatment of epithelial ingrowth. Lee *et al.* reported

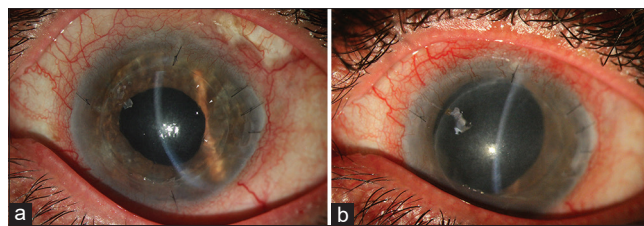


Figure 2: (a) Epithelial ingrowth, initial presentation (the arrowheads point to the edge of epithelial ingrowth). (b) The disappearance of epithelial ingrowth after 11 doses of methotrexate injections

a case of a 64-year-old man with a history of glaucoma and radial keratotomy who developed epithelial ingrowth from a persistent bleb leak.¹⁰ The ingrowth was successfully cured after intravitreal MTX (400 mg/0.1 ml) every 2 weeks for six doses. Furthermore, Lambert *et al.* administered intravitreal MTX to a patient with refractory proliferative membrane after cataract surgery, while membrane peel and endolaser treatments failed. After 12 injections (400 µg/0.1 ml) totally, there was no membrane recurrence.¹⁰

In our case, the resolution of ingrowth successfully occurred after weekly intracameral injection MTX (400 mg/0.1 ml) for a total of 11 doses (first, seven weekly doses; then after a month, another four weekly doses). There was no recurrence in 11 months of follow-up. This therapeutic effect of MTX may be due to its antiproliferative effects on abnormal cells responsible for epithelial ingrowth. Intracameral MTX injection may be used as an effective alternative treatment for epithelial ingrowth as it is less invasive than surgical excision. Although there is an experience for using this drug to treat intraocular lymphoma, more evidence is needed to show the safety of MTX injection in the anterior chamber. It should be noted that the patient's vision decreased from counting fingers to hand motions in the follow-up period. This may be due to the progression of retinitis pigmentosa or advanced glaucoma. Furthermore, MTX may have the potential for neuroretinal toxicity and might be responsible for our patient's gradual visual loss. Further studies on this subject are needed to determine the safety, efficacy, and dose-response curve of this drug for various presentations of epithelial ingrowth.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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