



Fig. 1—(A) Colour fundus photograph, right eye, with inferotemporal vasoproliferative tumour in the periphery. (B) Horizontal OCT slice highlighting epiretinal membrane. (C) 20 MHz B-Scan Ultrasound right eye showing lesion continuous with the retina. (D) Colour fundus photograph, right eye, at review, showing detached, contracted VPT. (E) Horizontal OCT slice confirming resolution of epiretinal membrane. (F) 20 MHz B-Scan Ultrasound right eye demonstrating detached VPT, in the vitreous.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at [doi:10.1016/j.jco.2018.10.009](https://doi.org/10.1016/j.jco.2018.10.009).

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Lindsay A. McGrath,*† Paul Rundle†

*University of Queensland, Brisbane, Australia; †National Ocular Oncology Service, Royal Hallamshire Hospital, Sheffield, U.K.

Correspondence to:

Lindsay McGrath; lindsay.mcg@gmail.com

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Inadvertent corneal stromal staining by trypan blue following Descemet's membrane endothelial keratoplasty



Trypan blue is an azo dye solution that effectively stains basement membranes such as the anterior lens capsule and Descemet's membrane.¹ In Descemet's membrane endothelial keratoplasty (DMEK), where the host Descemet's membrane and corneal endothelium are initially removed, trypan blue is used to stain the donor graft before injection to provide visibility during the unscrolling process in the anterior chamber. Trypan blue can also be injected after the descemetorrhesis and before graft injection to visualize any irregular tags or retained Descemet's membrane, both of which may increase the risk for graft detachment.²

DMEK is performed for Fuchs' endothelial corneal dystrophy (FECD), which is characterized by thickening of Descemet's membrane, progressive corneal endothelial cell loss, and deposition of extracellular matrix proteins in the form of guttae.³ Lattice corneal dystrophy (LCD) is a stromal dystrophy characterized by radially oriented linear amyloid opacities in the anterior stroma leading to vision loss and photophobia.⁴ In a MEDLINE search, no cases of concurrent FECD and LCD could be found. We present a novel case of inadvertent

stromal staining by trypan blue after DMEK in a patient with both FECD and clinically presumed LCD.

CASE PRESENTATION

A 77-year-old male presented with LCD and guttae in his amblyopic right eye. His best spectacle corrected visual acuity (BSCVA) was counting fingers at 3 feet, endothelial cell count (ECC) was 1401/mm², and central corneal thickness (CCT) was 601 μm. The patient underwent uncomplicated DMEK surgery with an 8.25 mm trypan blue-stained graft within an 8.50 mm descemetorrhesis. Intracameral trypan blue was injected into the anterior chamber after the descemetorrhesis to ensure no residual tags of Descemet's membrane remained. At the first postoperative follow-up appointment, there was notable diffuse blue staining of amyloid LCD deposits at the interface between the host stroma and the donor graft (Fig. 1). This deposition of trypan blue did not affect vision and has remained for 6 months following the DMEK surgery. At the most recent follow-up visit, BSCVA had improved to 20/100, ECC improved to 2353/mm², and CCT was 593 μm. The patient's fellow eye had undergone Descemet's stripping automated endothelial keratoplasty 9 years prior with pathology



Fig. 1—Slit lamp photograph of the patient's right eye at the 1-day postoperative visit after DMEK surgery. Significant trypan blue staining of lattice amyloid deposits at the interface between the host stroma and donor DMEK graft is evident.

confirmed findings of “endothelial accumulation consistent with Fuchs’ dystrophy.”

DISCUSSION

Trypan blue staining has demonstrated safe and efficacious results when utilized in corneal transplantation procedures. Majmudar and Johnson determined that staining a DMEK graft with trypan blue dye (0.06% or 0.15%) for up to 5 minutes increases visibility of the donor tissue for a sufficient period of time (110 minutes) with no decreased ECC.²

Five cases of inadvertent corneal stromal staining by trypan blue have been published, one of which was after a corneal transplantation procedure. In 2014, a retrospective case series by Farooq et al. described 4 cases of stromal staining in patients with LCD. One patient with a central stromal scar and thick ropy lattice lines underwent a deep anterior lamellar keratoplasty procedure where trypan blue was used to aid in removal of the Descemet’s membrane from the donor cornea.⁵ Persistent trypan blue staining of peripheral lattice lines was noted in the host stroma at postoperative day 176.⁵ It has been postulated that persistent staining of peripheral lattice lines is consistent with trypan blue’s affinity for amyloid deposits,⁶ and that a violation of the Descemet’s membrane must be present as trypan blue is unable to penetrate intact basement membranes.⁵ The remaining 3 cases by Farooq et al. were also patients with LCD, but occurred after cataract surgery where trypan blue was used to stain the anterior capsule.⁵ The fifth case of inadvertent stromal staining was described by Jhanji et al. in a patient after cataract surgery.⁷ Trypan blue was accidentally injected intrastromally in an attempt to stain the anterior lens capsule. In this case, the patient did not have LCD, and the significant postoperative stromal staining was attributed to improper wound construction, inability to locate the entry wound, and use of a blunt-tipped cannula.⁷

In summary, we present the first case of a patient with concomitant FECD and LCD. In addition, this is the first case of a patient with inadvertent corneal stromal staining by trypan blue after a DMEK procedure. Intraoperative removal of Descemet’s membrane allowed trypan blue to stain exposed posterior stromal amyloid deposits but was not visually significant. Ophthalmologists should be aware that using trypan

blue intraoperatively to improve Descemet’s membrane visualization during a corneal transplant procedure in a patient with LCD may lead to persistent corneal stromal staining.

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Austin Pereira,* Tanguy Boutin,† David S. Rootman,† Clara C. Chan†

*Faculty of Medicine; †Department of Ophthalmology and Vision Sciences, University of Toronto, Toronto, Ont.

Correspondence to:

Clara C. Chan, MD, FRCSC: clarachanmd@gmail.com

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