

Surgically-induced Corneal Changes Following Macular Translocation with Punctate Retinotomies and Chorioscleral Infolding (Limited Macular Translocation)

James CH Pan,¹*MMed (Ophth), FRCSEd (Ophth), FAMS*, Wee-Jin Heng,¹*MMed (Ophth), FRCSEd, FAMS*,
Kah-Guan Au Eong,^{1,2,3,4}*MMed (Ophth), FRCS (Edin & Glas), FAMS*

Abstract

Introduction: To report the sequential changes in corneal topography and astigmatism following limited macular translocation. **Clinical Picture and Treatment:** A 45-year-old-man who underwent limited macular translocation for idiopathic subfoveal choroidal neovascularisation in the right eye was evaluated by corneal topography and manifest refraction preoperatively and serially for 1 year postoperatively. **Outcome:** An increase in astigmatism with corneal steepening along meridians corresponding to the area of chorioscleral infolding was observed and this persisted for 1 year after surgery. Vector-analysed astigmatic change showed significant surgically induced astigmatism of 2.18 dioptres (D) X 52.9 degrees, 2.17 D X 57.8 degrees and 2.56 D X 59.1 degrees at 2, 5 and 12 months after surgery respectively. **Conclusion:** Surgically induced corneal changes are evident after limited macular translocation and may remain up to 1 year after surgery.

Ann Acad Med Singapore 2006;35:588-90

Key words: Astigmatism, Choroidal neovascularisation, Corneal topography, Ophthalmologic surgical procedure

Introduction

Changes in corneal curvatures and astigmatism after retinal surgery are well documented.¹ Although some of these changes are mild and transient, some have reported clinically significant irregular and asymmetric corneal changes.¹ Macular translocation with punctate retinotomies and chorioscleral shortening,² also known as limited macular translocation, is a relatively new vitreoretinal procedure that has been reported to cause significant corneal astigmatism.³ We report the sequential corneal changes following this form of macular translocation in 1 patient followed up for 1 year after the operation.

Case Report

A 45-year-old Chinese man presented with metamorphopsia in the right eye for 1 week. Ophthalmic examination and fluorescein angiography (FA) revealed a small idiopathic juxtafoveal choroidal neovascularisation (CNV). He underwent argon laser photocoagulation to

ablate the lesion. Three weeks after treatment, he complained of worsening metamorphopsia and an enlarging relative scotoma in his right eye. Repeat examination and FA disclosed a persistent CNV that had just extended under the geometric centre of the foveal avascular zone. He underwent limited macular translocation with chorioscleral infolding using non-absorbable sutures. The details of the technique used have been described elsewhere,⁴ but are briefly described here. After creating a superotemporal conjunctival peritomy from 7 to 2 o'clock position, 3 non-absorbable 5/0 Ethibond imbricating sutures were placed between the superior and lateral recti, 1 suture just nasal to the superior rectus in the superonasal quadrant and 1 suture just inferior to the lateral rectus in the inferotemporal quadrant. The sutures were placed in a mattress fashion and not tightened until later on in the procedure. A standard three-port near-total pars plana vitrectomy was performed and the vitreous base was trimmed. Three localised retinal detachments were created through 3 small retinotomies placed superior

¹ The Eye Institute @ Tan Tock Seng Hospital, Singapore

² The Eye Institute @ Alexandra Hospital, Singapore

³ Department of Ophthalmology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore

⁴ Singapore Eye Research Institute, Singapore

Address for Reprints: Dr James Chuan-Hsin Pan, Department of Ophthalmology, Tan Tock Seng Hospital, 11 Jalan Tan Tock Seng, Singapore 308433.

Email: James_Pan@ttsh.com.sg

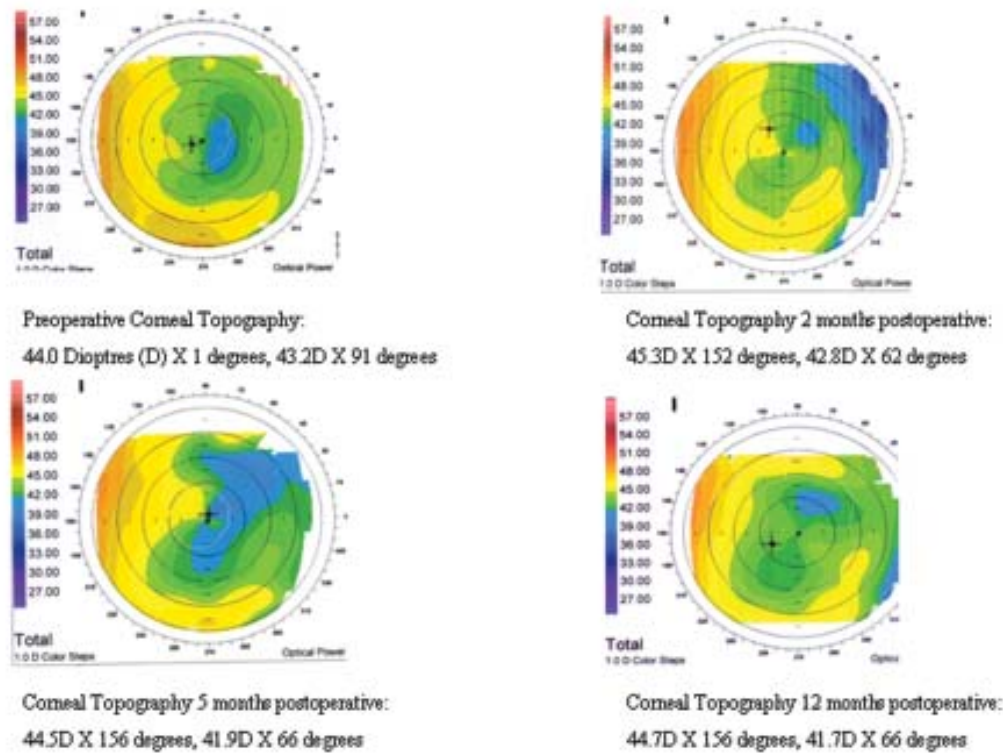


Fig. 1. Corneal topography of the patient's right eye before and after macular translocation with punctate retinotomies and choriocleral infolding.

Table 1. The Manifest Refraction, Best-corrected Visual Acuity and Corneal Astigmatism of the Patient's Right Eye Before and After Macular Translocation with Punctate Retinotomies and Choriocleral Infolding

Time after surgery	Spherical error (Dioptres)	Cylindrical error (Dioptres)	Best-corrected visual acuity	Surgically-induced corneal astigmatism (Dioptres)
0 (preoperative)	-2.00	-1.00 X 60 degrees	6/30	-
2 months	Plano	-2.75 X 70 degrees	6/12	2.18 X 52.9 degrees
5 months	Plano	-1.50 X 75 degrees	6/9-2	2.17 X 57.8 degrees
12 months	-0.50	-1.50 X 70 degrees	6/12	2.56 X 59.1 degrees

to the superotemporal vascular arcade, inferior to the inferotemporal vascular arcade and temporal to the macula. After a complete air-fluid exchange, the macula was detached by the gravitation of the subretinal fluid. The air in the vitreous cavity was then exchanged for fluid and the imbricating sutures were tightened while the eye was left soft. Fluid-air exchange was then repeated with an estimated 90% exchange. The sclerostomies and conjunctival peritomy were closed with 7/0 Vicryl sutures. Immediately after surgery, the patient was turned to his right for 5

minutes. From this position, without turning the patient on his back, he was sat upright and instructed to keep his head upright for several days. Postoperatively, effective macular translocation was achieved.

The patient's manifest refraction (Table 1) and corneal topography using Orbscan (Bausch & Lomb, Rochester, New York, USA) (Fig. 1) were performed preoperatively and at 2, 5, and 12 months postoperatively. Vector-analysed astigmatic change, calculated using method described by Alpíns,⁵ showed significant surgically induced astigmatism of 2.18 dioptres (D) X 52.9 degrees, 2.17 D X 57.8 degrees and 2.56 D X 59.1 degrees at 2, 5, and 12 months after surgery, respectively. There was therefore steepening of the cornea along meridians corresponding to the area of circumferential choriocleral infolding i.e., the upper outer quadrant of the right eye. Other clinical features of this patient have been reported separately previously.⁶

Discussion

Induced corneal changes after limited macular translocation can cause significant astigmatism that can inhibit visual rehabilitation. Optical correction using glasses or rigid gas-permeable contact lenses are potential options to maximise patient's vision.

Deramo and associates⁷ have described modifications to the surgical technique to reduce the induced corneal changes

after macular translocation. They reported 10 cases of successful macular translocation with temporary chorioscleral infolding using absorbable sutures. In their series, the induced postoperative corneal astigmatism resolved over time while effective macular translocation was maintained.

Surgical interventions have been used to reduce the induced corneal changes.³ These include scleral suture release with episcleral tissue dissection and incisional corneal refractive surgery. The disadvantages of these options include the risks of globe perforation and irregular astigmatism.

Our patient had induced corneal astigmatism of 2.18 D X 52.9 degrees in the early postoperative period and 2.56 D X 59.1 degrees at 1 year. This suggests that significant induced corneal astigmatism may remain up to 1 year after limited macular translocation. While care should be exercised when interpreting a single case report, a larger study will help to ascertain if our observation is correct.

REFERENCES

1. Hayashi H, Hayashi K, Nakao F, Hayashi F. Corneal shape changes after scleral buckling surgery. *Ophthalmology* 1997;104:831-7.
2. Au Eong KG, Pieramici DJ, Fujii GY, Ng EW, Humayun MS, Maia M, et al. Macular translocation: unifying concepts, terminology, and classification. *Am J Ophthalmol* 2001;131:244-53.
3. Kim T, Krishnasamy S, Meyer CH, Toth CA. Induced corneal astigmatism after macular translocation surgery with scleral infolding. *Ophthalmology* 2001;108:1203-8.
4. Au Eong KG, Pieramici DJ, Fujii GY, de Juan E, Jr. Limited macular translocation. Age related macular degeneration. New York: Marcel Dekker, Inc, 2002:289-318.
5. Alpíns NA. Vector analysis of astigmatism changes by flattening, steepening, and torque. *J Cataract Refract Surg* 1997;23:1503-14.
6. Au Eong KG. Initial experience of macular translocation in Singapore – one-year results. *Ann Acad Med Singapore* 2004;33:641-8.
7. Deramo VA, Meyer CH, Toth CA. Successful macular translocation with temporary scleral infolding using absorbable suture. *Retina* 2001;21:304-11.