Diurnal variation of corneal thickness in Patients with Fuchs’ corneal dystrophy

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Diurnal variation of corneal thickness in Patients with Fuchs' corneal dystrophy

Running title: Clinical application of pachymetry in Fuchs' dystrophy

Terence Soong Kwong-Weng1, Matthew Edwards2, May May Choo1, Visvaraja Subrayan1

1 Department of Ophthalmology, University of Malaya, Kuala Lumpur, Malaysia
2 Royal Hallamshire Hospital, Sheffield, UK

Correspondence to: Terence Soong Kwong-Weng. Department of Ophthalmology, Faculty of Medicine, University of Malaya, Lembah Pantai, 50603 Kuala Lumpur, Malaysia. terrencesoong@yahoo.com

Abstract
AIM: To evaluate the diurnal variation of central corneal thickness (CCT) in patients with Fuchs' dystrophy.

METHODS: Prospective analysis of changes in central corneal thickness in 33 patients with Fuchs' dystrophy (15 male, 18 female) aged between 42 and 75 years using a non-contact confocal corneal specular microscope (Topcon SP-3000P, Tokyo, Japan). Measurements were taken over an 8 hour period from 0800 till 1600 on the same day at 2 hourly intervals at the outpatient clinic. All patients provided informed consent.

RESULTS: Mean age of the patients was 62 years. The mean central corneal thickness was (606.6±107.5) (mean±SD) μm. The percentage change in central corneal thickness throughout the day was 5.8% (range 0.2%-35.1%). There was no significant difference in the mean diurnal variation of CCT in patients with Fuchs corneal dystrophy (P>0.05).

CONCLUSION: The CCT of patients with Fuchs' dystrophy did not vary significantly during the day. The measurement of corneal thickness in an outpatient clinical setting during daytime can be helpful in predicting the risk of corneal decompensation post cataract surgery but should not be the only determining factor to predict the choice of a triple procedure for these patients.

KEYWORDS: Fuchs’ dystrophy; corneal thickness; variation; pachymetry

INTRODUCTION
Fuchs’ corneal dystrophy is one of the leading causes of corneal decompensation after cataract surgery. The endothelial cell density of patients with Fuchs’ corneal dystrophy is abnormally low, compromising the pumping activity of the endothelial cells. Phacoemulsification has been shown to decrease the endothelial cell count by 8%-13%9,10. Thus, after cataract surgery, the endothelial cell density can fall below its physiological threshold. This further loss of endothelial cell function will lead to the loss of ability of the cornea to maintain corneal deturgescence; leading to corneal decompensation and bullous keratopathy which may eventually lead to the need for a penetrating or endothelial keratoplasty to achieve visual rehabilitation.

Corneal thickness is a relative measure of corneal hydration. Corneal thickness in humans varies throughout the day. The mean diurnal variation of the normal human corneal thickness was previously reported to be 7.2% by Harper et al11. Other factors which affect corneal hydration include the status of the corneal tear film12, contact lens wear13, alcohol consumption14 and oestrogen levels15.

In moderate to advanced corneal decompensation secondary to Fuchs' corneal dystrophy, corneal thickness may be the only objective measure of corneal endothelial function. Specular microscopy on severely oedematous corneas would give inaccurate cell counts, polymegatism or pleomorphism of the endothelial cell layer. Seitzman et al16 suggested that a preoperative pachymetry

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