

Asymmetrical Corneal Topography in Map-Dot-Fingerprint Dystrophy Resembling Keratoconus

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ABSTRACT

Map-dot-fingerprint dystrophy cause painless blurred vision due to irregular astigmatism. Corneal topography may show asymmetry and irregularity and can resemble keratoconus. Two patients with map-dot dystrophy with unilateral blurring of vision are presented that were misdiagnosed as keratoconus due to asymmetric corneal topography. Medical treatment with hypertonic saline and lubrication in one patient and alcohol assisted epithelial delamination in the second patient restored visual acuity and restored normal appearance of corneal topography.

Keywords: Keratoconus, Corneal topography, Map-dot-fingerprint, Corneal dystrophy.

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INTRODUCTION

Map-dot-fingerprint (MDF) dystrophy is usually diagnosed due to recurrent corneal erosions.¹ However, some patients may have painless blurred vision due to irregular astigmatism produced by the uneven corneal epithelium.² Corneal topography may show asymmetry and irregularity.³ This paper presents two cases of MDF dystrophy with unilateral blurring of vision that were misdiagnosed as keratoconus due to asymmetric corneal topography.

Patient 1

A 38-year-old female underwent corneal topography due to blurred vision in both eyes that could not be corrected

with spectacles. The topography demonstrated asymmetric superior steepening (Fig. 1), and the patient was referred to our cornea service diagnosed as keratoconus. Best corrected visual acuity was 20/40 in OD, refraction: -3.75 diopter (D) sphere, and 20/30 in OS, refraction -2.25 D. Slit-lamp examination revealed epithelial map-like patterns in both corneas (Fig. 2) indicative of map-dot-fingerprint dystrophy. The rest of the ocular examination was normal. The patient was treated with sodium chloride 5% eyedrops qid and lubricating duratears ointment at night. After 1 week of treatment, best corrected visual acuity improved to 20/20 in both eyes. Refraction was -3.75 D sphere in OD, and -2.25 D in OS. During a 1 year follow-up the patient was satisfied. Trial to stop the treatment led to recurrence of blurred vision and the patient had to continue the treatment constantly. She refused any surgical treatment.

Patient 2

A 41-year-old female complained of blurred vision in her right eye. She underwent extensive medical work-up that included visual fields examination, fluorescein angiography and MRI brain scan that were normal. Corneal topography was performed due to a newly detected astigmatism in her right eye. Topography demonstrated irregular inferior steepening of 3D difference in the right eye (Fig. 3) and a diagnosis of keratoconus was made. A surgical treatment with intracorneal rings was offered. The patient was referred to our cornea service for consultation. Best corrected visual acuity was 20/50 in OD (refraction: $-0.75/+3.25 \times 160$), and 20/20 in OS without correction. On slit-lamp examination, fingerprint patterns were present in both

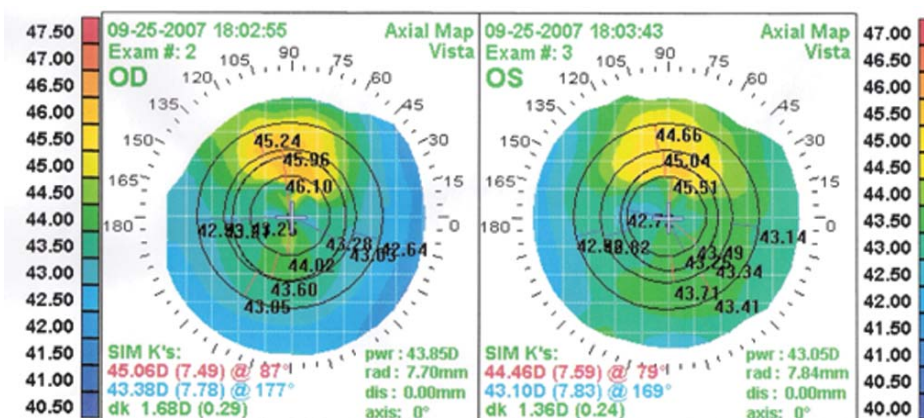


Fig. 1: Corneal topography of patient 1. There is a superior asymmetry of 2 D in the right eye and 1.4 D in the left eye

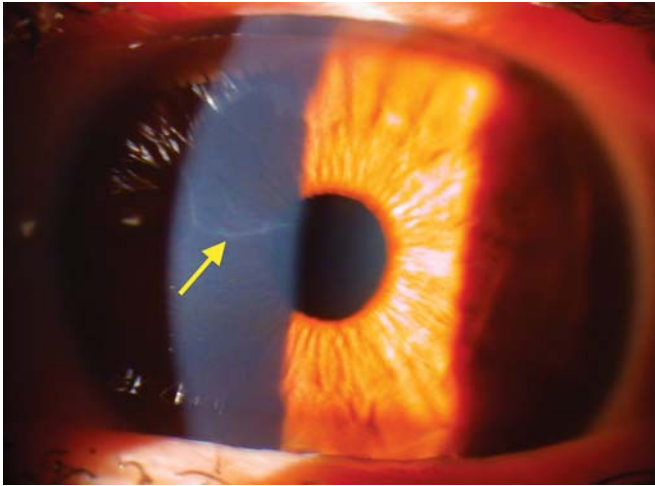


Fig. 2: Slit-lamp photograph of the right eye of patient 1. There are map-like epithelial patterns (arrow) indicative of map-dot-fingerprint dystrophy

corneas. The patient was treated with sodium chloride 5% eyedrops qid and duratears ointment (Alcon Puurs, Belgium) at night. Visual acuity did not improve, and the patient began to suffer from recurrent erosions in her right eye. The patient underwent alcohol 20% assisted epithelial delamination using the technique described by Dua et al.¹ One month after the procedure, best corrected visual acuity in OD improved to 20/20 (refraction: $-0.25/-0.50 \times 138$). Recurrent erosions did not recur in a 1 year follow-up. Corneal topography performed after 10 months demonstrated regular astigmatism (Fig. 4).

DISCUSSION

Patients having MDF dystrophy usually present with painful corneal erosions or foreign body sensation upon awakening.¹ However, some patients may present with painless blurring of vision.³ Slit-lamp examination of the cornea can detect epithelial map-like configurations, dots or fingerprint patterns.⁴ Fluorescein staining typically demonstrates fast

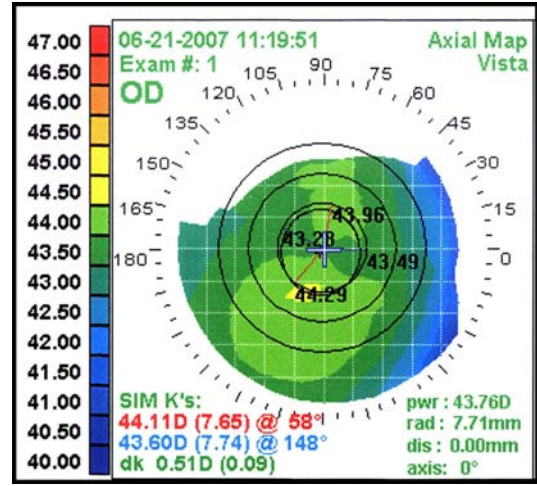


Fig. 4: Corneal topography of the right eye of patient 2, 10 months after alcohol-assisted delamination demonstrating normal with-the-rule astigmatism

disappearance of the fluorescein film in the affected areas. These signs may be missed in some patients, especially when there is no history of recurrent erosions.³ Refraction may reveal irregular astigmatism due to epithelial irregularity.² The topographical map can be asymmetric and resemble keratoconus.³ Inferior-superior asymmetry in corneal topography is one of the hallmarks in the early detection of keratoconus.^{5,6} A misdiagnosis of keratoconus may lead to erroneous treatment. Our second patient was scheduled for intracorneal segments implantation due to presumed keratoconus. When a patient becomes a keratoconus suspect, he is deferred from refractive surgery, while photorefractive keratectomy (PRK) may be the definite treatment for MDF patients. The initial treatment for MDF keratopathy consists of hypertonic solutions during the day and lubricating ointment at night to improve epithelial attachment and prevent the adhesion of the loose epithelium to the eyelids during sleep, leading to epithelial detachment. In our first case this treatment improved vision and the patient was

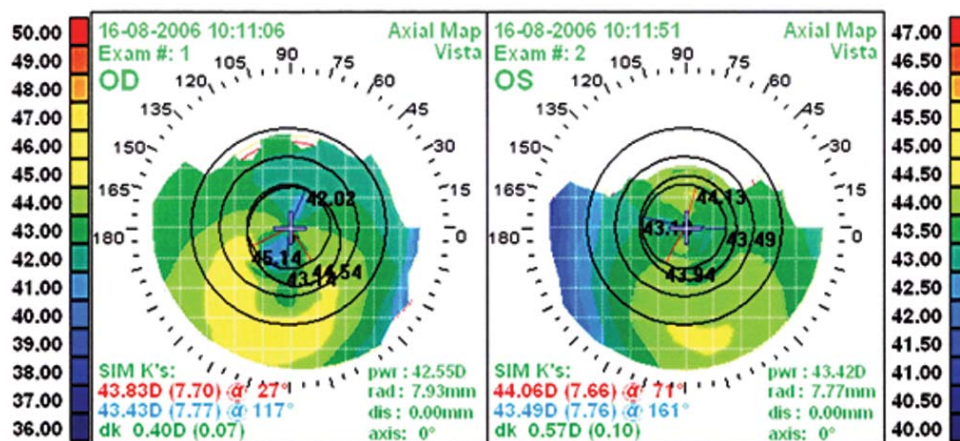


Fig. 3: Corneal topography of patient 2 at presentation. The topography in the right eye demonstrates asymmetric inferior steepening of 3D resembling keratoconus. The topography of the left eye is normal

pleased and rejected any surgical intervention. In our second patient, medical treatment did not ameliorate the visual symptoms. Recurrent erosions appeared that required surgical intervention. Alcohol-assisted epithelial delamination was performed and led to long-term relief of symptoms. There are several surgical options to treat MDF keratopathy including stromal punctures with a needle or neodymium:yttrium aluminum garnet (ND:YAG) laser and therapeutic photokeratectomy with excimer laser that can be combined with a refractive correction.⁷⁻⁹ Another surgical treatment is 20% alcohol-assisted delamination, that was originally described by Dua et al¹ and was shown to be a safe and effective treatment for recurrent corneal erosions. They showed by transmission electron microscopy of debrided sheets of epithelium from patients abnormal hemidesmosomes in the basal epithelial layer and a subcellular amorphous nonfibrillar proteinaceous material. It is possible that alcohol-assisted peeling of the epithelium removes such subepithelial debris and enables a firm attachment of the epithelium. The advantage of such treatment over phototherapeutic keratectomy (PTK) is that it does not alter the refraction, while PTK may induce hyperopic refractive change.⁹ In our second patient, alcohol-assisted epithelial delamination restored visual acuity with reduction of the astigmatism. Postoperative topography demonstrated regular with-the-rule astigmatism with disappearance of the inferior steepening (Fig. 4).

SUMMARY

We described two patients with MDF dystrophy that were presented with painless blurring of vision and have been erroneously diagnosed as having keratoconus due to asymmetric topography. In one patient, medical treatment relieved the symptoms and in the second patient, alcohol-assisted epithelial delamination restored vision. MDF

dystrophy is usually diagnosed due to recurrent corneal erosions. Infrequently, it causes blurred vision and astigmatism with an asymmetric topographical appearance that may mimic keratoconus.

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