

Reconsidering Terrien's marginal degeneration and Fuchs superficial keratitis: a case report of juxtalimbal peripheral corneal degenerations.

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Abstract

Purpose: This case suggests more evidence linking Terrien's marginal degeneration and Fuchs superficial keratitis as related phenotypes of a single condition.

Methods: This is a retrospective case report.

Summary: This report describes a case of a single patient who presented with bilateral peripheral corneal degeneration that developed with unique presentations of Terrien's marginal degeneration in one eye and Fuchs superficial keratitis in the fellow eye. Terrien's and Fuchs have classically been described as two distinct entities. However, their pathophysiology continues to remain unclear. This case suggests that both conditions may share a common inflammatory pathway with two distinct phenotypes. The shared clinical characteristics and similar management strategies of these two conditions also suggest that it may be more clinically productive to address these conditions together rather than as distinct disease processes.

Keywords: Fuchs superficial keratitis, Terrien's marginal degeneration, Peripheral corneal degeneration, Peripheral ulcerative keratitis, Sjogren's syndrome.

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Introduction

The differential for the degenerative corneal disease can be subdivided into depositional conditions, which result from the accumulation of lipids or other substances in the cornea, and intrinsic conditions, which result from a primary dysfunction of the corneal connective tissue. Clinically, peripheral corneal disorders are often distinguished by a characterization of the lesion as truly juxtalimbal versus those with an area of perilimbal sparing. Common conditions of the peripheral cornea, such as corneal arcus or pellucid marginal degeneration, which spare an area of marginal cornea adjacent to the limbus can, therefore, be differentiated from those entities which present with juxtalimbal lesions.

Case Report

A 64-year-old African American female with a history of depression and metabolic disorder presented to Cornea Clinic for evaluation of red and irritated eyes. She complained of itchiness and redness, and describes her eyes as "dry." She noticed blurriness during these symptomatic episodes. These symptoms began roughly two months before the presentation and she reports that she was diagnosed with a pink eye one month ago by her primary care provider. At that time, she was prescribed several topical antibiotics which provided no relief.

Her medical history is significant for hypertension, hyperlipidemia, gastroesophageal reflux disease, osteoarthritis, and depression with no prior history of ocular disease. She denied prior ocular surgery or trauma. She takes no topical medications and is treated for the above medical disease by her primary care provider. She also denies any family history of ocular disease.

On her initial examination, she had good best-corrected visual acuities of 20/25 in the right eye and 20/20 in the left eye. Intraocular pressures were within normal limits. Her slit lamp exam demonstrated significant meibomian gland dysfunction in both eyes as well as significant peripheral corneal thinning. In both eyes, she had 20% circumferential perilimbal corneal thinning which has mild neovascularization temporally. The right eye demonstrated a leading edge of stromal lipid deposition superotemporally and had mild superficial punctate keratitis nasally, but was notably clear centrally. The left eye did not demonstrate any significant superficial punctate keratitis and was also notably clear centrally. A representative photograph of initial corneal findings can be appreciated in Figure 1. A fluorescein examination did not reveal any epithelial defects other than punctate epithelial erosions of the right eye. Her conjunctiva and sclera were white and without injection or hyperemia. The anterior chamber was quiet without inflammation.



Figure 1. Slit-lamp photographs of the right and left eye, respectively, demonstrating peripheral corneal thinning at the time of presentation.

In addition to a dry eye disease that was diagnosed and treated, the patient was diagnosed with bilateral peripheral corneal degeneration considering a differential of Fuchs Superficial Marginal Keratitis versus Terrien's Marginal Degeneration.

The lack of epithelial defect without signs of infectious infiltrate, pointed toward Terrien's and Fuchs rather than Peripheral Ulcerative Keratitis including Mooren's ulcer. Distinguishing characteristics between Terrien's and Fuchs include the formation of pseudopterygium and more typical symptoms of ocular irritation in Fuchs and the characteristic lipid deposition in Terrien's. At the time of diagnosis, the lack of pseudopterygium and the confounding dry eye disease made it difficult to distinguish between these two entities. Given the uncertainty surrounding the precise diagnosis, the patient was referred for systemic rheumatologic testing, which returned positive for anti-nuclear antibody at low titer (1:160) and anti-Sjögren's-Syndrome-Related Antigen A (anti-SSA). Antineutrophil Cytoplasmic Antibodies (ANCA), rheumatoid factor, anti-cyclic citrullinated peptide, and hepatitis serologies were negative in addition to infectious testing for syphilis and tuberculosis.

The patient was followed closely for several years to monitor for progression. During follow up, peripheral corneal findings remained relatively unchanged in the right eye, with circumferential stromal thinning, notable lipid deposition, and infrequent periodic episodes of irritation. However, the patient's condition in the left eye was noted to progress, specifically inferotemporally with extreme thinning and the development of a pseudopterygium overlying this lesion. The patient was also noted to have a mildly peaked pupil toward this area of thinning, which could indicate an occult perforation that spontaneously resolved. The patient's symptoms of ocular irritation were also notably more significant in the left eye. A representative photograph of corneal findings from a 2-year follow can be appreciated in Figure 2. Given this development, the patient was classified with Terrien's Marginal Degeneration in the right eye and Fuchs Superficial Keratitis in the left eye.



Figure 2. Two years after the initial presentation. Slit-lamp photographs of the right and left eye, respectively, with cobalt blue light and fluorescein, demonstrating peripheral corneal thinning of the right eye without overlying epithelial defect and peripheral corneal thinning of the left eye with the development of an inferotemporal pseudopterygium.

Discussion and Conclusion

The differential for the degenerative corneal disease can be subdivided into depositional conditions, which result from the accumulation of lipids or other substances in the cornea, and intrinsic conditions, which result from a primary dysfunction of the corneal connective tissue. Clinically, peripheral corneal disorders are often distinguished by a characterization of the lesion as truly juxtalimbal versus those with an area of perilimbal sparing. Common conditions of the peripheral cornea, such as corneal arcus or pellucid marginal degeneration, which spare an area of marginal cornea adjacent to the limbus can, therefore, be differentiated from those entities which present with juxtalimbal lesions. From a pathophysiological perspective, this geographic characterization may be important, as the corneal limbus represents both locus of corneal epithelial stem cell generation and the border of the corneal vascular watershed, presenting a unique opportunity for inflammatory involvement of juxtalimbal tissues.

Of this category of peripheral corneal degeneration with juxtalimbal involvement, the broad group of Peripheral Ulcerative Keratides (PUK) often tops the differential given its prevalence. PUK, which encompasses several specific ocular and systemic diseases, is generally described by crescent-shaped juxtalimbal corneal lesions. These lesions can vary in size and characteristic stromal degradation is accompanied by some degree of overlying epithelial defect. There is a strong association with systemic rheumatologic disease (~50%), as well as an association with scleritis (~36%) [1]. Infectious ulcers, when presenting in a marginal geographic distribution fall under this broad category, and are often accompanied by characteristic infiltrates. Mooren's Ulcers, another specific form of PUK, also present with crescent-shaped peripheral corneal lesions. These ulcers, however, have a characteristically undermined central edge with a linear epithelial defect at the central margin. These lesions can sometimes be difficult to identify sub-acutely, as there is often conjunctivalization of the thinned cornea, which may disguise their characteristic appearance [2,3].

A second clinical category of juxtalimbal peripheral corneal degeneration involves those entities which do not have an overlying epithelial defect. Our patient's presentation, with near-circumferential corneal stromal thinning without epithelial defect, is, therefore, most consistent with the two entities in this category: Fuchs Superficial Marginal Keratitis and Terrien's Marginal Degeneration. Fuchs is a slowly progressive thinning of the superficial, peripheral corneal stroma with central sparing. Fuchs also presents with the development of a pseudopterygium over the area of thinning. Of note, pseudopterygia are identified by the tight adherence of invasive conjunctival tissues to the underlying cornea as distinguished from true pterygia by the inability to pass a probe beneath the conjunctival growth at the corneal limbus. Fuchs more often presents with intermittent episodes of ocular irritation [4]. Terrien's Marginal Degeneration also presents with centrally sparing circumferential corneal stroma thinning, though it has a predilection for sparing the inferior region. Terrien's is typically quiet, without visible inflammation, and entails

superficial corneal vascularization, with a characteristic linear intrastromal deposition of lipid. Terrien's is generally asymptomatic but can present with painful episodes of ocular inflammation [5]. The most important differentiating factors between Fuchs and Terrien's are the pseudopterygia in the former and lipid deposition in the latter.

The pathophysiology of both diseases is currently unknown, but there have been several hypotheses proposed suggesting that Terrien's may be mediated by inflammatory cells [6,7]. There is currently only 1 documented case in the literature that establishes a link between Fuchs/Terrien's and systemic inflammatory disease. This case report, published in 2011 by Keenan et al. describes a patient who presented with the appearance of Fuchs in one eye, Terrien's in the other eye, and was found to have systemic ANCA vasculitis [8]. Keenan et al. propose that Terrien's and Fuchs may represent two different presentations of one common underlying pathway [8]. Notwithstanding this one case, the paucity of literature about Fuchs and Terrien's leaves a question as to the significance of our patient's positive anti-SSA test and likely Sjögren's Syndrome. A targeted literature review does not return any documented associations between Sjögren's Syndrome and juxtalimbal corneal disease. A single case series noted juxtalimbal peripheral keratitis in 2 patients with rheumatoid arthritis who also had secondary Sjögren's syndrome [9] and one additional study was found which noted the coexistence of Sjögren's with pellucid marginal degeneration, a peripherally degenerative disease with peri-limbal sparing [10]. It is unclear if there is an underlying link in the pathology of Sjögren's related inflammation and the corneal degenerations demonstrated in this case.

I report this case to suggest more evidence linking Terrien's and Fuchs marginal corneal degenerations as related phenotypes of a single condition. Since being originally characterized by their respective eponyms more than 120 years ago, Terrien's and Fuchs have classically been described as two distinct entities. However, their specific pathophysiology continues to remain unclear. I suggest that both conditions may share a common inflammatory pathway with distinct phenotypes. The shared characteristics and similar management strategies also suggest that it may be more clinically productive to address these conditions together rather than as distinct disease processes.

Conflicts of Interest

None

Disclosures

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