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Case Report

Vogt Striae in Advanced Keratoconus: Diagnostic Value of a Biomicroscopic Sign — A Case Report

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Abstract: We present the case of a 24-year-old patient consulting for progressive decrease in visual acuity in the right eye evolving over 18 months [1]. Biomicroscopic examination found inferior corneal thinning, a Fleischer ring, and Vogt striae in the posterior stroma [4]. Corneal topography confirmed advanced keratoconus [2]. Vogt striae allowed the symptoms to be linked to keratoconus and its severity to be graded, guiding appropriate management.

Keywords: Keratoconus, Vogt Striae, Biomicroscopy, Diagnosis, Cornea.

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INTRODUCTION

Keratoconus is a progressive, non-inflammatory corneal ectasia characterized by corneal thinning and protrusion, causing irregular astigmatism and decreased visual acuity [1]. Its prevalence is estimated at approximately 1 in 2,000 in the general population, with a peak onset in adolescence or young adulthood [2]. Diagnosis relies on biomicroscopic examination and corneal topography, which reveal a set of characteristic clinical signs [2]. Among these signs, Vogt striae are fine, whitish linear opacities parallel to the steepest meridian, located in the posterior stroma, and temporarily disappearing under digital pressure on the globe [3]. Their diagnostic value is recognized, but their prevalence and exact significance remain debated, particularly in advanced forms [4]. We report the case of a patient with advanced keratoconus in whom Vogt striae were a determining biomicroscopic element for diagnosis and severity assessment, and discuss the place of this sign in current diagnostic strategy [5].

CASE REPORT

A 24-year-old man, a student, with no notable ophthalmological history, consulted for progressive decrease in visual acuity in the right eye, which had appeared approximately 18 months earlier. The patient reported increasing visual discomfort, mild photophobia, and a frequent need to change optical correction. He had no family history of keratoconus and no history of chronic eye rubbing.

Ophthalmological examination found corrected visual acuity of 4/10 in the right eye and 9/10 in the left eye. Objective refraction showed significant irregular astigmatism in the right eye. Slit-lamp examination revealed inferior stromal thinning, an incomplete horseshoe-shaped Fleischer ring, and especially Vogt striae (Fig. 1): fine whitish lines, vertically oriented, located in the posterior stroma, disappearing with gentle pressure on the globe. The rest of the anterior segment examination was unremarkable. Fundus examination was normal.

Corneal topography (axial curvature map) confirmed advanced keratoconus in the right eye, with maximum keratometry at 52 diopters, asymmetric “bow-tie” irregular astigmatism, and apical pachymetric thinning (Fig. 2). The left eye showed early topographic signs, without Vogt striae visible on biomicroscopy.

Given this presentation, corneal cross-linking was proposed to stabilize the ectasia on the right side. The patient was informed of the possible progression and the need for regular follow-up.

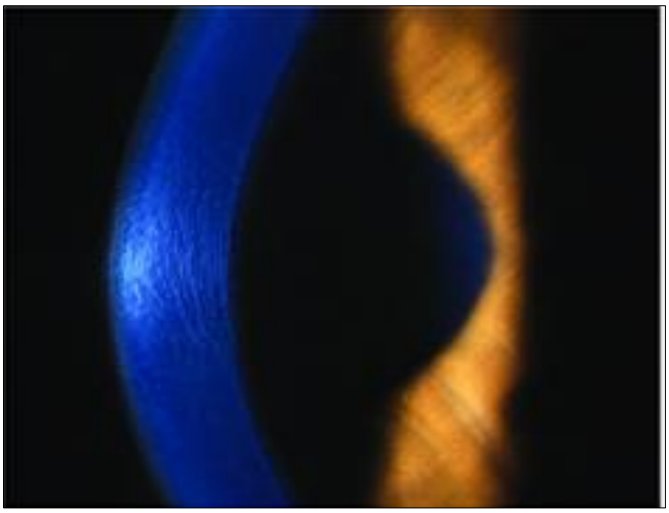


Fig. 1: Slit-lamp examination reveals fine, vertically oriented striae in the deep corneal stroma and Descemet's membrane, consistent with Vogt's striae, a characteristic finding of keratoconus

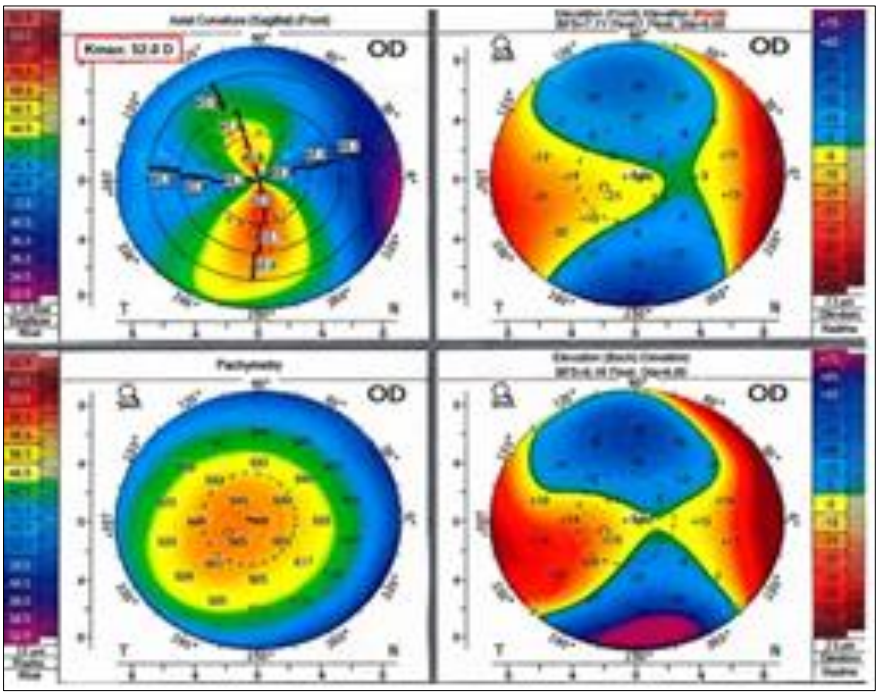


Fig. 2: Corneal topography (axial curvature map) confirmed advanced keratoconus in the right eye, with a maximum keratometry reading of 52 diopters, an irregular asymmetric "bow-tie" astigmatism, and apical pachymetric thinning

DISCUSSION

Vogt striae are a classic biomicroscopic sign of keratoconus, first described by Vogt in the early 20th century [3]. They present as fine whitish lines, parallel to the steepest meridian, located in the posterior stroma, and disappearing under digital pressure on the globe [4]. Their pathophysiology has been clarified by in vivo confocal microscopy, which showed that these striae correspond to alternating dark and light bands in the posterior stroma, reflecting collagen lamellae subjected to mechanical stress [4]. In keratoconus, striae run vertically from Descemet membrane toward the anterior stroma, unlike other situations in which they adopt an oblique V-shaped arrangement [6].

Diagnostically, Vogt striae have major orienting value, but they are not pathognomonic on their own [5]. Similar stromal striae can be observed in other situations, particularly corneal hypoxia related to contact lens wear or early-stage Fuchs dystrophy [7]. However, in the context of irregular astigmatism and corneal thinning, their presence is highly suggestive of keratoconus [2]. Their prevalence increases with disease severity: they are found in approximately 17% of eyes with mild to moderate keratoconus, versus more than 80% of eyes with advanced keratoconus [8]. In our observation, the presence of Vogt striae in a young patient with irregular astigmatism rapidly oriented the

diagnosis toward advanced keratoconus, confirmed by topography [9].

Beyond their diagnostic value, Vogt striae have prognostic and follow-up value [5]. Their extension toward the anterior stroma is correlated with more severe topographic parameters (higher keratometry, greater astigmatism) and with a more marked decrease in keratocyte and stromal nerve density [5]. Thus, systematic search for this sign at the slit lamp, although sometimes difficult in early forms, remains an essential clinical step, particularly in settings where topography is unavailable [10]. In vivo confocal microscopy can detect stromal bands in nearly 78% of keratoconic eyes, whereas striae are visible at the slit lamp in only 63% of cases, highlighting the clinical underestimation of this sign [10].

CONCLUSION

Vogt striae constitute a simple, non-invasive biomicroscopic sign that is highly suggestive of keratoconus, with prevalence increasing with ectasia severity [2]. Their systematic search at the slit lamp, facilitated by the digital pressure maneuver, helps guide diagnosis and assess disease progression, in addition to corneal topography [10].

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