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NEW METRICS FOR CXL

Refining measurement should lead to better treatment.

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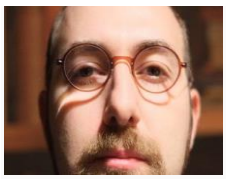

David Touboul MD

New metrics for following keratoconus progression will help to refine treatment strategies, said David Touboul MD during a symposium on corneal crosslinking (CXL) at the 21st ESCRS Winter Meeting in Maastricht, The Netherlands.

“Prior to CXL, keratoconus was classified by severity scales based on the macroscopic appearance and thickness of the cornea. However, now that it is possible to halt the progression, progression rate indices are needed that rely less on macroscopic data,” said Dr Touboul, CHU, Bordeaux, France.

Progression rate is a ratio that can vary according to patient age and biomechanical, morphological, optical and functional ocular metrics, said Dr Touboul. In order of precocity, metrics for keratoconus progression start with biomechanical anisotropia; then posterior bulging; then anterior bulging & thinning; and lastly, refractive changes and visual acuity symptoms.

But applying all of this to clinical practice is difficult. Biomechanical metrics such as in vivo elastography are not yet useful in the clinic. Morphological metrics such as slit lamp changes are difficult to quantify. And although central corneal bulging remains the main criterion for CXL treatments, it represents neither peripheral nor epithelial changes.

What about corneal thinning? “Increasing 1D of keratometry can correspond to a corneal thinning below the repeatability threshold measured with optical coherence tomography (OCT) or Scheimpflug technologies. So, based on a recent Cochrane review, corneal thickness was too inconsistent to assess CXL effectiveness,” warned Dr Touboul.

Measuring optical metrics, which describe optical aberrations, seem like a logical method, but there are important fluctuations between aberrometers, and both pupil aperture and accommodation are confounding factors. The same applies to functional metrics such as visual acuity, which is also too variable.

So, what’s new? Dr Touboul finds the development of pachymetry mapping promising

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“Using OCT, corneal structure can be analysed by separating stromal changes and epithelial compensation, making this modality very interesting. The dominant method to rate progression is topographical and tomographical analysis,” said Dr Touboul.

This is strongly correlated with worsening of keratoconus in terms of biomechanics, retinal image quality as defined by the point spread function, and with quality of life. Indeed, the decision to intervene in order to halt progression surgically is best made based on this morphological metric, he said.

But clinicians cannot focus too much on a single metric. Defining keratoconus progression rates requires the analysis of the entire patient’s profile. There is no magic number to determine therapeutic indications, he emphasised.

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