Progressive Keratoconus: How Tracking them for Treating them Earlier

As reported in the current issue by Raiskup et al, corneal cross-linking procedure has been shown through multiple studies to be effective in halting the progression of ectatic disease. Interestingly, to date, there is still no consensus on the most relevant way to monitor the disease progression in order to track down the first sign of corneal weakening. As mentioned in the keratoconus management guideline edited by Alio et al, in the last issue of the journal, detecting the progressive state at the very beginning of the evolution process is as important as the diagnosis itself, as it may help to preserve satisfying visual capacities when cross-linking procedure is performed early enough, before the cornea deteriorates too much. Repeated biomechanical evaluation of the cornea would be the optimal way to detect a progressive tissue weakening over time, but although the available devices hold some promises for this monitoring approach, unfortunately to date, none of them have achieved yet the required level of accuracy and reliability for being considered as a gold standard. However, anterior segment imaging technologies have vastly improved over the last 10 years, thus providing a thorough analysis of the characteristics of the cornea, including posterior surface representation, thickness distribution profile, corneal total power and corneal wavefront. These parameters have been extensively studied with several different systems and found very useful for improving the sensitivity of early keratoconus detection. Whereas the current leading hypothesis is that keratoconus disease may be first detectable at the posterior surface, interestingly, this finding still did not impact the way we are monitoring the ectatic disease. Indeed, most of the parameters used for the definition of a progressive keratoconus and ultimately for indicating whereas a cross-linking procedure should be recommended or not, are still based on the modifications of anterior surface (anterior keratometry and corneal astigmatism) and corneal thinning. However, in view of these recent findings, it seemed reasonable to question the use of anterior corneal parameters alone as a gold standard to monitor the ectatic process and track the earliest sign of progression. In an attempt to evaluate the kinetic of these various corneal parameters in a cohort of progressive keratoconus, our group has recently reported the relevance of tracking the changes of the posterior surface and vertical coma, as they were found to be modified significantly earlier than the anterior keratometry readings. This finding is actually consistent with the generally accepted approach for detecting keratoconus at their mildest stages, which includes the analysis of the posterior surface and corneal coma. Therefore, these parameters may be relevant warning signs to closely look at when monitoring progressive keratoconus. Cutoff values of posterior surface changes and corneal coma, as well as predicting factors of progression still have to be determined through additional studies with larger cohorts of progressive keratoconus. However, the consistency of findings in early keratoconus detection and progressive keratoconus, along with the improvements of the anterior imaging technology should question our current approach of monitoring the disease and our definition of progressive keratoconus. If a cornea is now labeled as a suspect keratoconus because of an abnormal posterior surface, a keratoconus should probably be labeled as ‘suspicious progression’ as well in case of early modifications of the posterior surface without frank modification on the anterior cornea?

REFERENCES

David Smadja, MD
Clinician, Department of Ophthalmology
Anterior Segment Unit Bordeaux Hospital University
National Reference Center for Keratoconus, Bordeaux, France;
Institute of Nanotechnologies and Advances Materials
Bar Ilan University, Ramat Gan, Israel