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CXL at Three Years: No Lens Opacities

By Linda Roach, Contributing Writer

Ophthalmologists who worry that corneal crosslinking (CXL) with riboflavin and ultraviolet A (UVA) might harm the crystalline lens received some reassuring news at the Academy's Joint Meeting in Chicago earlier this fall. Data presented during Refractive Surgery Subspecialty Day by Fabrizio I. Camesasca, MD, on the results of unilateral treatment with riboflavin-UVA in 24 progressive keratoconus patients indicated that their crystalline lenses were as transparent three years after CXL as they were preoperatively.

These results were based on a series of four Pentacam studies in each treated eye. The mean patient age at the time of the procedure was 34.9 ± 6.5 years (range, 26 to 50).

Dr. Camesasca and his colleagues at the Istituto Clinico Humanitas in Milan, Italy, used Scheimpflug imaging and 3-D software (Oculus Pentacam HR and HR Software, Oculus Optikgeräte, Wetzlar, Germany) to look for early changes in lens transparency that precede cataract formation. The Pentacam HR is the latest version of a Scheimpflug imaging system that ophthalmologists can use to measure the eye's anterior dimensions. The HR software integrates sectional images into three-dimensional views of the anterior chamber, from endothelium to posterior lens surface.

Previous studies by these researchers, who are lead by institute Chairman Paolo Vinciguerra, MD, have indicated that the application of riboflavin prior to UV irradiation has the intended effect of protecting endothelial cells. Endothelial cell counts at one year¹ and two years² after CXL fell slightly from baseline, but not by a statistically significant amount ($P = 0.13$), they said.

Concern About CXL in Young Adults

With this study, the research group especially wanted to address ophthalmic surgeons' concerns about the possible risk of early cataract after CXL in young adults. Most keratoconus and post-LASIK/PRK ectasia patients are decades younger than the usual cataract patient, and UVA is a well-known etiologic factor in cataract formation,³ Dr. Camesasca noted.

"The ocular structure most exposed to UV rays during crosslinking, after the corneal endothelium, is the crystalline lens," he said.

Scheimpflug Densitometry

HR also includes a densitometry function that the researchers believe provides accurate, objective and reproducible measurements of lens transparency. The software compares a patient's lens density with an advanced nomogram, quantifies the density and area of lens opacification and computes an overall grading of lens density on a scale from zero to three.

The researchers found that the patients' lenses measured between zero and one preoperatively and at two years and three years and between zero and two at one year, Dr. Camesasca said.

The software also can display sequential Pentacam images and analyze them to help ophthalmologists detect changes in lens transparency between exams. If an opacified area is detected, its 3-D dimensions can be measured and tracked objectively over time, he said.

Additional Study Data

CXL also improved vision among the study's patients, Dr. Camesasca added.

Mean UCVA and BSCVA before undergoing the treatment were 20/180 and 20/40, respectively. This improved to 20/50 UCVA and 20/25 BSCVA after CXL ($P < 0.05$). Spherical equivalent was reduced by 0.96 D, and the mean simulated keratometry also was reduced ($P < 0.05$).

Inclusion criteria for the study were progressive keratoconus (demonstrated on differential topographies or tomographies) and age greater than 18 years. Exclusion criteria were: corneal thickness less than 400 microns at the thinnest point, herpetic keratitis history, severe dry eye, concurrent corneal infections, pre-existing corneal opacities and concomitant autoimmune disease.

References

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Financial Interests

Dr. Camesasca has no financial interests to disclose.