CXL ADVERSE EVENTS
Review of CXL/PRK combo patients reveals its potential for side-effects
by Roibeard O’hEineachain in Istanbul

Combining a partial photorefractive keratectomy (PRK) with collagen cross-linking (CXL) can produce very good visual outcomes in patients with progressive keratoconus, but the treatment is not without its risks said Anastasios John Kanellopoulos MD, Athens, Greece, at the 15th ESCRS Winter Meeting’s Cornea Day.

Dr Kanellopoulos presented his findings regarding the short- and long-term complications that have occurred among 412 keratoconus eyes with 2-7 years of follow-up after undergoing combined topography-guided PRK and CXL treatment according to the Athens Protocol.

“The core concept of this technique is to treat ectasia with this combination treatment, involving partial hyperopic PRK and partial myopic PRK to normalise the cornea, and then cross-linking to stabilise its shape,” Dr Kanellopoulos noted.

The Athens protocol involves first performing a phototherapeutic keratectomy using the corneal epithelium as a masking agent, then carrying out a topography-guided partial PRK, removing a maximum 50 microns, and then applying mitomycin-C 0.02 per cent for 20 seconds before carrying out the CXL.

“We have argued that by removing Bowman’s and the epithelium we get better cross-linking. Comparisons with OCT clearly show that compared to standard cross-linking using the Athens protocol results in a more intense and wider cross-linking over a greater diameter of the cornea,” Dr Kanellopoulos said.

As an example of a best-case scenario Dr Kanellopoulos described the case of a US Air Force pilot who developed post-LASIK ectasia with a refraction of +1.50 D sphere and -2.50 D cylinder at 135 degrees and a best-corrected visual acuity of 20/40. He underwent the combined topographically guided PRK and cross-linking procedure and at three years’ follow-up his uncorrected visual acuity was 20/15 and he remains on active duty.

However, the combined PRK and CXL procedure also brings with it an increase in the potential for side effects and complications. Although in his series there were very few cases in which the cornea failed to stabilise, there were several cases of postoperative haze and delayed epithelial healing. Moreover, there have also been reports in the literature of infection, herpetic keratitis, and corneal melts.

In addition, he noted that regression requiring re-treatment occurred in 1.5 per cent of his patients. Paradoxically, the reverse of that, a continuing flattening of the cornea, has occurred in several of his patients. In one case, there was a 2.5 D hyperopic shift over four years of follow-up, during which time visual acuity fell from 20/20 immediately postoperative to 20/40.

“We have followed these patients seven years out and we have seen continued flattening, even at seven years out. So special caution needs to be taken on the refractive side to not over-correct these eyes,” Dr Kanellopoulos emphasised.

The epithelium may take longer to heal in some cases, requiring longer use of bandage contact lens. When scarring is also present Dr Kanellopoulos said he now removes the scar to let the epithelium heal over again. Another epithelial abnormality that can occur are Salzman-like nodules which persist despite intensive lubrication for up to three months.

In one case a young man who underwent the combined treatment developed PRK-like haze one year afterwards. He had spent the whole summer at the beach and the heavy sunbathing resulted in delayed scarring on the Athens-protocol-treated eye. However, it improved somewhat with steroids.

Some permanent haze is possible. He added that the worst case he has seen there was scarring with white spots, which were possibly a result of over-cross-linking.

“In the cases with complications we have employed autologous serum. We will also in some cases extend the use of a bandage contact lens all the way to six weeks. Ample Lubrication is also very important, as is treatment of blepharitis where it is present and we use Cyclosporine A drops for persistent dry eye,” he added.