Torsional technology raises the bar for phacoemulsification

Mitchell Weikert

Intra-operative results documented in the study

Maria Sánchez MD

Courtesy of Abhay Vasavada MBBS, MS, FRCS

Phaco Technology

TORSONAL phacoemulsification performed with the OZil handpiece (Alcon Laboratories) results in safer and more efficient surgery than conventional longitudinal phaco, according to several reports at the XXV Congress of the ESCRS.

“I think that we are going to be seeing more surgeons switching to torsional phacoemulsification in the future. In my clinical experience, OZil reduces the surgical time, uses less fluidics and is more gentle on the corneal endothelium, particularly in harder cataracts,” Abhay Vasavada MBBS, MS, FRCS, told delegates.

As the latest cataract removal modality on the Infiniti Vision System (Alcon), OZil incorporates a combination of handpiece, hardware and software enhancements. By using ultrasonic oscillations of an angulated or curved needle, torsional phacoemulsification dramatically alters both the energy profile of the tip and the reaction of the lens material contacted by the vibrating needle.

Dr Vasavada of the Ildave Cataract & IOL Research Centre, Ahmedabad, India, presented results of a randomised prospective study of 360 eyes divided into three equal groups: group one treated with continuous torsional using OZil and maximum amplitude at 100 per cent, group two with microburst and traditional longitudinal ultrasound on the Infiniti system, and group three with microburst and longitudinal ultrasound with the Legacy Everest system.

Dr Vasavada noted that surgical clock time, fluid volume, and endothelial cell loss were significantly less with torsional phacoemulsification. Furthermore, there was less incidence of corneal oedema on the first postoperative day for patients treated with OZil, he said.

He also noted that the cutting efficiency of OZil enables him to use this modality on all grades of cataract. “In India, I often have to remove many rock-hard, brunescent cataracts. For these cases, many surgeons often feel compelled to use high parameters. With torsional technology, however, we can maintain low parameters and better safety and you do not have to worry about posterior capsule rupture or other complications,” he said.

Another clear benefit of torsional technology is the stability of the anterior chamber during such procedures, according to Maria Sánchez MD.

“OZil technology uses significantly less phaco power compared to traditional longitudinal phaco. Even in difficult cases with high cataract density, it is usually not necessary to convert to longitudinal phaco and the anterior chamber remains stable at all times,” she said.

Dr Sánchez, University of Heidelberg, Germany, noted that the side-to-side movement of the OZil handpiece improves cutting efficiency, decreases repulsion of nuclear fragments and enhances thermal safety. Her prospective randomised study included 56 patients, half of whom were treated with torsional phacoemulsification and the other half with traditional longitudinal phacoemulsification.

“I think that we are going to be seeing more surgeons switching to torsional phacoemulsification in the future. In my clinical experience, OZil reduces the surgical time, uses less fluidics and is more gentle on the corneal endothelium, particularly in harder cataracts,” Abhay Vasavada MBBS, MS, FRCS

All procedures were performed without complications and no conversion from OZil to standard ultrasound was necessary, said Dr Sánchez. The average power used for the ultrasound group was significantly higher than the OZil patients, although no correlation was found between average power used and cataract density.

The impact of torsional phacoemulsification on postoperative corneal wound architecture in coaxial microincision surgery (MICS) was the focus of a separate study by Mitchell Weikert MD.

“Coaxial MICS is increasing in popularity and new modes of energy delivery, such as torsional ultrasound, may offer advantages in comparison to conventional methods. Scanning electron microscopy has demonstrated incision trauma following both small incision cataract surgery and MICS, so we wanted to compare the effect of torsional and longitudinal ultrasound modalities on postoperative corneal wound architecture in coaxial MICS,” he said.

For Dr Weikert’s study, microcoaxial MICS was performed on human cadaver eyes using the mini-flared 45-degree Kelman tip with an ultrasleeve through a 2.2mm incision. Three modalities were assessed: 100 per cent OZil torsional (continuous), pulsed longitudinal (30 per cent power, 30 pulses per second, 30 per cent on time) and a blend of OZil and longitudinal (40 per cent power and 10 pulses per second). Corneas were harvested and analysed both qualitatively and quantitatively using scanning electron microscopy (SEM).

Pre- and postoperative wound gauge measurements showed that all incisions remained within 0.1mm of their pre-phacoemulsification size following cataract removal. The SEM analysis showed that all eyes demonstrated peri-incisional loss of corneal endothelial cells and tearing of Descemet’s membrane. There was a slightly greater loss of peri-incisional endothelial cells in the OZil group, but these eyes had proportionally larger values of continuous dissipated energy (CDE). No differences were found in Descemet’s membrane tearing. When the results were normalised to the CDE level, no differences were noted between the different ultrasound modalities.

It was concluded that both endothelial cell loss and Descemet’s membrane trauma may increase with exposure to increasing phaco energy, independent of the method of delivery.

mweikert@bcm.tmc.edu
icirc@abhavvasavada.com
maria.sanchez@med.uni-heidelberg.de

If you are an ophthalmologist, this is the podcast you should be listening to on www.escrs.org

We will discuss the big issues in cataract and refractive surgery with our panel of experts. And if you have any suggestions as to who should be on EuroTimes Podcasts, please let us know.

Podcasts, please let us know.