Getting the best out of torsional phaco

Dermot McGrath

SURGEONS interested in deriving the maximum benefit from torsional phacoemulsification may obtain better results using a 45-degree mini-flare Kelman tip rather than the 30-degree model, according to David Allen FRCS, FRCOphth.

“Torsional phacoemulsification dramatically alters both performance in terms of safety, efficacy and predictability,” he said. “We wanted to determine if continuous, micropulse or microburst torsional phacoemulsification provided more efficient nuclear removal at the same time as limiting ultrasound energy dispersion in the eye,” said Dr Packard.

“Some concern in hard cataracts with the OZil system,” he said. “We found that using torsional phaco in soft cataract was satisfactory but there was some concern in hard cataracts with problems of tip clogging and a high CDE ratio. The addition of a limited percentage of longitudinal phaco, about 30 per cent linear, resulted in more efficient phaco. Also, we found that custom pulse mode had lower CDE ratios and was friendlier to the corneal endothelium. But clearly we need more studies of different torsional modalities and tip designs in the future,” he said.

Dr Allen’s study included 90 eyes of 56 patients with grade 4 nuclear cataracts who were divided into three equal groups. In group one, patients were treated with 100 per cent linear continuous ultrasound, group two with 100 per cent panel burst ultrasound with an on-time of 50 to 100 milliseconds, and group three with custom pulse mode with increasing on-time in both longitudinal and torsional and 30 per cent duty cycle in either modality.

The results showed the highest incidence of corneal oedema in group one and the least in group three. He concluded that the custom pulse group showed superior performance in terms of safety, efficacy and predictability.

“It seems that the longitudinal element of ultrasound prevents the clogging of the tip and hence reduces the postoperative corneal oedema; decreases the duration of the surgery and results in faster visual rehabilitation,” he said.

For surgeons seeking a good compromise between energy dissipation and efficiency with the OZil system, Richard B Packard MD, FRCS, FRCOphth said that microburst mode might offer the best option for safe and efficient cataract removal.

“We wanted to determine if continuous, micropulse or microburst torsional phacoemulsification provided more efficient nuclear removal at the same time as limiting ultrasound energy dispersion in the eye,” said Dr Packard. "We found that the least energy usage was required in the microburst programme, which is obviously better for the eyes that are being treated in this way.”

Dr Packard explained that all sculpting was performed using 100 per cent linear torsional, while three different settings were used for the removal of chopped nuclei; programme one with linear continuous torsional at 100 per cent maximum, programme two with 30 micropulses per second with a duty cycle of 30 per cent and a maximum power setting of 60 per cent, and programme three with 35 millisecond microbursts increasing linearly to micropulsing at maximum power similar to programme two. Power used and the overall time in foot position 3 were noted as a measure of efficiency. Twenty eyes with grade two to three nuclei were removed with each programme.

The mean CDE ratio for programme one (continuous in chop mode) was 25.6 with a foot pedal time of 30 seconds; programme two (micropulse in chop mode) had a CDE of 18.3 and a foot pedal time of 42 seconds, and programme three (microbot in chop mode) had a CDE of 10.7 with a foot pedal time of 35 seconds.

“The least energy usage was required in the microburst programme at the expense of slightly greater foot pedal time when compared to continuous torsional phaco. We also concluded that micropulse mode seemed to work best with the settings chosen for this study,” he said.

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