Bimanual MICS offers benefits in safety and efficiency

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in Lisbon

BIMANUAL microincision cataract surgery (MICS) is a safe and efficient technique that offers several advantages over standard coaxial phacoemulsification, according to a number of recent studies.

Alessandro Franchini MD, told delegates attending the XXIII Congress of the ESCRS that the better fluidics offered by bimanual MICS ultimately results in safer procedures and more rapid visual rehabilitation than procedures performed by standard coaxial phacoemulsification.

In standard coaxial phaco the irrigation flow is too near the aspiration and this means that the nucleus fragments can be pushed away from the tip. Separating aspiration and irrigation in the bimanual approach means that we experience an excellent increase in followability and holdability using a lower vacuum setting, he said.

Dr Franchini noted that another advantage of the bimanual approach is that the separate irrigation line can be manipulated as a surgical instrument and used together with open-ended irrigation choppers to flush lens fragments from the eye or exert greater control over surgical manoeuvres during phacoemulsification.

In a study carried out at the Eye Institute at the University of Florence, Italy, Dr Franchini compared the results of a group of 62 patients treated with standard coaxial phacoemulsification and 56 patients who underwent cold ultrasound microphacoemulsification using the AMO Witestar Sovereign system.

Using an innovative infrared camera and new customised software, Dr Franchini and his co-researchers were able to evaluate the increase in temperature of the phaco tip during bimanual and coaxial phacoemulsification.

One of the most important results to emerge from the study is that bimanual sleeveless phaco, irrespective of the machine or surgical technique used, records a lower increase in temperature than coaxial phaco.

There is no simple explanation to account for this difference, but my own belief is that it is perhaps because we have less effective phaco time and an increase in followability with the bimanual approach,” he said.

Another important safety benefit of bimanual phaco that emerged in the study was the statistically significant reduction in endothelial cell count density loss in patients who underwent MICS procedures compared to coaxial phaco.

Dr Franchini said that even if the development of new tools and instruments has now made it possible to perform coaxial phacoemulsification through ultra-small incisions with great results, he still believed that bimanual phaco has many potential advantages.

“There are more advantages to bimanual MICS than just the size of the incision. With bimanual MICS we get better fluidics in a closed system with less thermal energy and an increase in followability, all of which means safer and more efficient surgery for our patients,” he said.

The MICS learning curve

While there are undoubted benefits in using bimanual MICS in terms of enhanced safety and efficiency, surgeons should nevertheless be prepared to spend some time learning to master the requisite techniques, advised Ann Haustermans MD.

The transition from coaxial to bimanual phacoemulsification surgery involves a definite learning curve. All of the complications we experienced in our study occurred in the first 50 cases. However, once the adequate incision size, appropriate instruments and optimum machine settings are defined, bimanual phaco becomes a safe and efficient technique, reflected in very low U/S average, absolute phaco time and elapsed phaco time, she said.

Dr Haustermans reported her personal experience of the first 100 cases of bimanual phacoemulsification performed between November 2003 and September 2004 at the A.Z. Klinia hospital in Brasschaat, Belgium.

After testing various instruments, phaco needles and phaco settings, Dr Haustermans finally settled on the optimal settings for safe and efficient bimanual phaco surgery. Her technique includes using a Naqaha-style 19-gauge irrigating chopper with two sideports of 0.8mm and a 20-gauge 15-degree thin-tip phaco needle. All surgeries were performed with the Millennium system (Bausch and Lomb) with the Venturi pump and Custom Control software. For chopping, Dr Haustermans used a burst duration of 120 milliseconds and a burst interval of 600 milliseconds, with maximum U/S power of 25% and maximum vacuum at 325 mmHg and a bottle height of 130 cm.

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For chopping with the burst duration set at 120 milliseconds only a few bursts of phaco are required to impale the nucleus. And with a burst interval of 600 milliseconds the surgeon has sufficient flexibility and time to stop using phaco when the needle has reached the appropriate depth for chopping the nucleus, she said.

For segment removal Dr Haustermans used a short burst duration of 6 0 milliseconds with intervals of 12.0 milliseconds. These micropulses cut without pushing the nuclear fragments away and the double interval allows the aspiration to pull the fragments back onto the phaco tip. Excellent cutting and followability results in optimal use of phaco energy and very short phaco times, she said.

The mean U/S average in Dr Haustermans’ study was 11%, with a mean elapsed phaco time of 15 seconds and a mean absolute phaco time of 17.1 seconds. A standard foldable IOL was implanted in 74 patients while 26 patients received an AcrySmart IOL through a 2.0 mm incision. No sutures were needed in 97% of cases.

Intraoperative complications included a conversion to coaxial phaco in three patients and iris prolapse in four cases, said Dr Haustermans.

“At that time I was still using a microflow needle but after I switched to the thin-tip phaco needle, iris prolapse was no longer an issue,” she explained.

Other complications included a partial zonular dialysis in four patients, one anterior capsular rupture with vitreous loss and one posterior capsular rupture with vitreous loss that required an anterior vitrectomy. All intraoperative complications happened in the first 50 cases.

Dr Haustermans said that no postoperative complications were observed. Visual acuity outcomes were excellent, she said, with 97% of eyes recording a BCVA of 20/25 or better at the three-week follow-up mark.

In a separate presentation Jorge Alio MD reported the results of a prospective consecutive randomised series of 100 cataract patients, half of whom were treated by standard coaxial phaco and the other half by microincision cataract surgery.

The study concluded that MICS significantly lowered the mean phaco time, the mean total phaco percentage, the mean effective phaco time and the surgically induced astigmatism compared to coaxial phacoemulsification.

He found that surgically induced astigmatism is eliminated with MICS. It is a more efficient technique, decreasing effective phaco time and highlights a trend towards less use of fluid during cataract surgery, he said.

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