

Innovations open door to sub 2.0 mm microcoaxial phaco

Dermot McGrath

EVEN as the trend towards microincision cataract surgery has gathered pace in recent years, some surgeons have remained reluctant to abandon their tried-and-trusted coaxial techniques in favour of a bimanual approach.

New advances in materials and techniques, however, mean that such surgeons may soon be able to take advantage of smaller incisions without sacrificing their usual methods using sleeved coaxial phaco tips.

Takayuki Akahoshi MD, Mitsui Memorial Hospital, Tokyo, Japan, notes that a new technique he has developed allows him to implant a 6.0 mm optic single-piece AcrySof® IOL (Alcon) through a sub-2.0 mm incision and avoids the need to use bimanual phaco techniques.

"Nowadays bimanual phaco is enjoying a bit of a boom but I have never liked this procedure. Due to the instability of the anterior chamber, I could not raise the parameters of the phaco machine and took longer surgery time. Furthermore, although the individual incisions were small, the total incision size is still larger than my conventional 2.5 mm coaxial phaco. But small incision is attractive so I decided to try to perform coaxial phaco through a small incision," Dr Akahoshi said.

Dr Akahoshi said that the new technique is performed with the Alcon Infiniti® phacoemulsification system using a conventional 1.1 mm flared Akahoshi phaco tip with a specially modified ultra small-diameter sleeve called the Nano Sleeve.

After making a clear corneal incision by a diamond keratome, Dr Akahoshi prechops the nucleus and then performs phacoemulsification. He then implants a 6.0 mm optic single-piece AcrySof IOL using the Royale injector with C-cartridge by a new method called "Counter Traction Implant Technique".

Standard inexpensive equipment

Dr Akahoshi noted that one of the merits of the sub 2.0mm surgery is that surgeons can use their conventional instruments and techniques

"It is not necessary to buy a very expensive sideport capsulorhexis forceps and it is

not necessary to use unfamiliar irrigating choppers. Conventional instruments are sufficient to perform this surgery," he said.

Dr Akahoshi said that for soft cataracts he performs vertical Karate Prechop with a Combo prechopper and for denser cataracts he supports the nucleus with a second instrument called a nucleus sustainer and then uses a sharp Universal prechopper to divide the nucleus into pieces to facilitate easier emulsification.

"By using Phaco Prechop and linear burst mode on the Infiniti, the U/S energy required for the cataract removal is remarkably reduced. The sleeve and minimum U/S energy protects the incision."

He advised surgeons when loading the C-cartridge to place both haptics on the optic and insert the lens in the cartridge at a downward angle. Even though the cartridge itself does not fit through the sub-2 mm incision, Dr Akahoshi said it suffices to place the cartridge at the edge of the incision and use the plunger

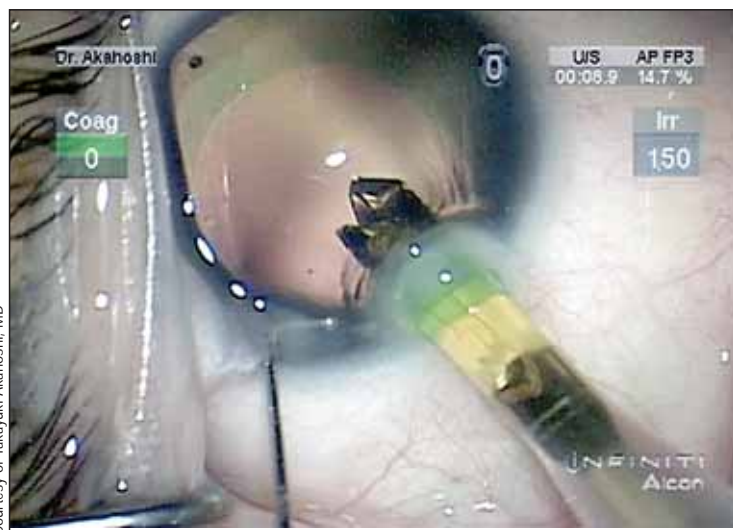
to implant the lens into the eye.

"The key point is to provide a sufficient counter force to the cartridge. I use a nucleus sustainer for this purpose. Keeping a rigid ocular tension during implantation is another important point," he added.

This technique is made possible due to the elbow joint between the optic and the haptic on the single-piece AcrySof lens, noted Dr Akahoshi, allowing the IOL to pass through the un-enlarged incision before unfolding in the anterior chamber.

Summing up, Dr Akahoshi said he has now performed this surgery on more than 1,300 patients and has enjoyed a 100% success rate with the 6.0 mm AcrySof. This new implantation technique has made the breakthrough in the micro incision cataract surgery to utilize a good IOL.

"It is interesting to note that on the first day after surgery these patients exhibit no corneal oedema and have crystal clear corneas. I have confidence that this represents a new higher



Courtesy of Takayuki Akahoshi, MD



Takayuki Akahoshi



Khiun Tjia

standard of surgery. There is no great difference in postoperative BCVA but the UCVA data showed a big difference. Because there is less astigmatism and less inflammation, patients have very good vision and rapid visual rehabilitation soon after the surgery," he said.

Khiun Tjia MD also advocates the benefits of micro-coaxial lens removal using small incisions even though he acknowledged that bimanual phaco continues to gain in popularity.

"Bimanual phacoemulsification is increasingly popular but it has drawbacks such as wound stretching and distortion because of rigid instruments manipulating through these tight incisions. So wound sealing is more difficult and cumbersome and stromal hydration has to be routinely used. Theoretically, there is also an increased risk of endophthalmitis and the current range of microincision IOLs have no long term track record and are not widely accepted yet," he said.

New reduced diameter sleeve

Dr Tjia, Isala Clinic, Zwolle, the Netherlands, said that a smaller coaxial tip with a reduced diameter sleeve, called Ultrasleeve, will soon enable surgeons to perform standard microcoaxial phacoemulsification through 2.0 mm to 2.5mm incisions.

Dr Tjia said the Ultrasleeve permits efficient coaxial phacoemulsification without the current drawbacks of bimanual phaco. In particular, significant wound stretching by the hard metal bimanual phaco instruments and subsequent weakening of the wound is avoided by the use of a soft sleeved coaxial tip. He uses standard coaxial instruments: a

C-cartridge and the Monarch II injector and employs a wound-assisted injection technique to implant the AcrySof SN 60 6.0 mm optic IOL without the need for stromal hydration.

Apart from the fact that irrigation flow is reduced from 30% to 35% with the Ultrasleeve compared to a standard coaxial phaco tip, there is no other difference to standard coaxial phacoemulsification, said Dr Tjia.

To obtain the best outcomes using the Ultrasleeve, Dr Tjia advised using optimised settings on the Alcon Infiniti, with a bottle height of 90 cm, an aspiration rate of 30 ml/min (compared to normal 45 ml/min) and a vacuum of 400 mmHg (normal 450 mmHg).

"The technique has a lot of advantages. The Ultrasleeve coaxial MICS uses standard phaco techniques and a standard injection system. It is used to implant a proven hydrophobic acrylic IOL 6.0 mm optic and provides safe and watertight 2.0-2.2 mm incision phacoemulsification," he said.

Looking to the future, Dr Tjia said he was convinced that there will be a continuous effort for further innovation in ultrasound and fluidics to deliver safe and non-distorted true sub 2.0-mm incisions.

"There is a new generation of injection technology for the same proven single-piece AcrySof platform on the horizon and those future innovations for microcoaxial phaco may mean we no longer have to use bimanual phaco," he said.

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Drs Akahoshi and Tjia will be discussing these procedures further during presentations at the ESCRS Congress in Lisbon, (Tuesday, September 13th, 2005, 08.00-10.30, Free Paper Session, Auditorium VIII, Ultra Small Incision Co-Axial Phaco/Hard Nuclei)