

Horses for Courses: Using the Right IOL for the Right Eye

Four leaders in refractive and cataract surgery came together in an interactive APACRS webinar, moderated by Ronald Yeoh, MD, Singapore and Graham Barrett, MD, Australia, on September 23, 2021 to present their clinical experience and case scenarios on choosing the right intraocular lens (IOL) for their patients. There currently exists a plethora of available IOLs for patients today and the panel provided a guide to the thought process of choosing the right IOL for the right eye.

Monofocal IOLs/ Monovision: Where are we today?

Mun Wai Lee, MD, Malaysia

Around the world, the use of advanced technology IOLs is low, and is even lower in Asia Pacific (APAC) countries. Although astigmatism prevalence in APAC countries is comparable to other regions of the world, only 2.7% of toric IOLs are implanted in patients compared to 7.2% in the United States and 30.4% in Australia. Similar trends are seen with presbyopia correcting IOLs. Dr. Lee explained that some barriers to adoption of these IOLs are due to both surgeon and patient factors. Surgeons may have limited access to technology or lack of confidence in the technology. Additionally, there may be increased costs with specific instrumentation as well as more complicated management of side effects. On the patient side, patients have no access or knowl-

edge about such IOL technology nor are they willing to gamble on the risk of the side effects.

Of the lenses that are implanted in cataract surgery, 90% are monofocal IOLs, and they are the “bread and butter” of cataract surgery, says Dr. Lee. As the type of IOL material has changed from rigid to foldable over the past decades, surgeons have overcome a variety of side effects such as inflammation, calcification, and glistening.

The Clareon® IOL is a monofocal IOL that was developed with a hydrophobic acrylic material. The water content of the lens, when developed, was increased, though not to the point of becoming hydrophilic. Paired together with the innovative AutonoMe™ preloaded IOL delivery system, the Clareon® IOL can be delivered in a very smooth manner during surgery. In Dr. Lee’s multi-center retrospective study, “Clinical Evaluation of a New Hydrophobic Preloaded Intraocular Lens with a Novel Delivery System,”¹ his initial experience with the Clareon® IOL showed not only good visual outcomes but also good refractive predictability and stability along with good contrast sensitivity. Using the Clareon® IOL with the AutonoMe™ delivery system was unique in that the delivery system was easy to prepare with a minimal learning curve and an intuitive ergonomic design. Although manually-loaded IOLs are very familiar to cataract sur-

geons, Dr. Lee believes that preloaded delivery systems are currently trending and will become the norm for a number of reasons. Because preloaded systems are disposable, there is no additional IOL handling in the operating room, making surgical time more efficient. No IOL handling also means less risk of infection or damage to the IOL.

In a personal audit of Dr. Lee’s own cataract surgery practice, he found that he was implanting monofocal IOLs about 60% of his time, while toric IOLs were implanted 20% of the time and presbyopic IOLs and monovision surgery both made up 10% of his cataract surgery cases. Because Dr. Lee stands by his “bread and butter” of monofocal IOLs, he is confident that these IOLs provide a bigger “landing zone” while extending the range of vision to intermediate distance.

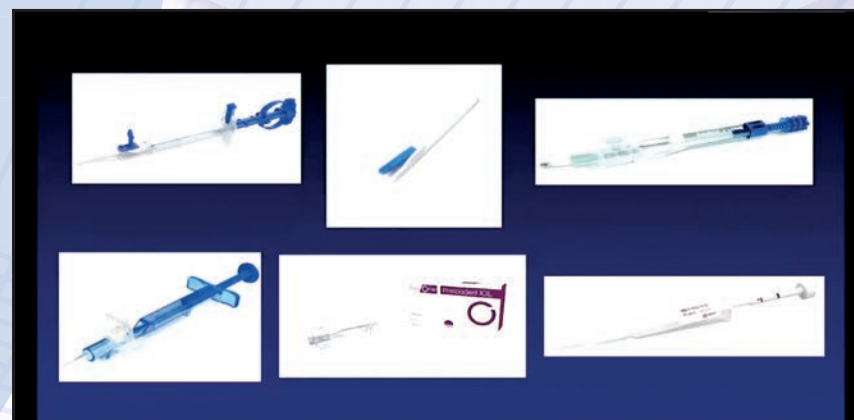
1. Lee MW et al. Clinical Evaluation of a New Hydrophobic Preloaded Intraocular Lens with a Novel Delivery System. Paper presented at: APACRS 2021; 30-31 July 2021; Virtual.

Toric IOLs: Importance, stability, and when to start using?

Tae-Im Kim, MD, South Korea

Refractive errors such as astigmatism, caused by an irregular anterior or posterior surface of the cornea or an uneven curvature of the lens or retina, result in undesirable effects for patients such as eye strain and excessive squinting due to distortion in vision. Cataract surgery can remove lenticular astigmatism; however, remaining astigmatism is always a concern. In fact, the prevalence of corneal astigmatism over 1 diopter prior to cataract surgery is 36%. There have been many methods aiming to neutralize astigmatism during cataract surgery such as limbal relaxing incision, clear corneal incision arcuate keratotomy, excimer laser treatment, and toric IOL implantation. Data has shown that most cataract procedures have adopted the use of toric IOLs since 2011.

Based on the European Society of Cataract and Refractive Surgeons (ESCRS) 2019 clinical trends survey results, there was a dramatic in-



A majority of Malaysian surgeons prefer implantation with a single-handed push, preloaded IOL delivery system.

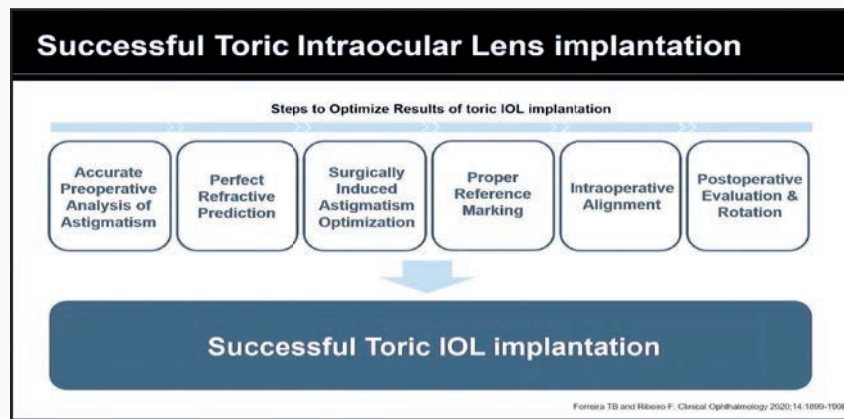
crease in the use of toric IOL for managing astigmatism. If cost were not an issue, 52% of patients with clinically astigmatism would receive a toric IOL.

Dr. Kim explained that a patient who has regular corneal astigmatism and is interested in spectacle independence will be a good candidate for toric IOL implantation. However, there are other factors to consider when deciding whether a patient is a good candidate. Those with posterior capsular dehiscence, poor pupillary dilation, and prior vitreoretinal procedures may not achieve desired results with toric IOLs due to lack of IOL stability, a basic requirement for perfect toric IOL performance. Additionally, "successful toric IOL implantation is mainly determined by accurate preoperative analysis of astigmatism and well-performed IOL alignment," says Dr. Kim.

For preoperative analysis of astigmatism, optical biometry is the most preferred method to measure power and to select the axis. To analyze the pattern of astigmatism and to confirm the axis, a topographic exam is frequently added, explained Dr. Kim.

Reference marking is another factor that may predict successful toric IOL implantation. Manual reference marking with ink is still a commonly used technique. However, from the ESCRS 2019 survey results, surgeons are increasingly preferring digital image registration over manual ink marking with either axial instruments or a slit lamp.

For intraoperative alignment, image-guided systems



Successful toric IOL implantation is mainly determined by accurate preoperative analysis of astigmatism and well-performed IOL alignment.

may greatly improve the evaluation step during toric IOL implantation. Surgeons must consider patient factors, intraoperative factors, and IOL factors that may affect toric IOL rotation. Dr. Kim explained that patient factors could include a long axial length, thick lens, or an asymmetric capsular bag shape. During operation, surgeons should pay attention to a large continuous curvilinear capsulorrhexis size, hyperinflation, and poor watertight sealing. Even IOL factors such as its material or shape may contribute to toric IOL rotation.

Dr. Kim's take home message from her presentation was that patients with regular astigmatism are recommended to receive toric IOL implantation, which can provide an expected residual astigmatism of under 0.5 diopter with good long-term stability. Though there may be a steep learning curve for implanting toric IOLs because of increased time for preoperative analysis and greater surgical skill, Dr. Kim believes that there are many resources for enhancing surgical skill of toric IOLs. She strongly recommends surgeons to "learn everything from A to Z about toric IOLs before starting your first

case and to continue updating your knowledge."

The New EDOF Kid on the Block

Michael Lawless, MD, Australia

With access for nearly two years to the AcrySof® IQ Vivity® IOL and the AcrySof™ IQ Vivity™ Toric Extended Vision IOL, Dr. Lawless discussed his experience with the IOLs in his practice as well as insight from his participation in the Vivity Registry Study. Vivity Registry Study is a multicenter, ambispective, non-comparative, open-label study (including countries from Europe, Australia, and New Zealand) that looked at 129 patients with a bilateral implant of either the AcrySof® IQ Vivity® IOL or the Vivity™ IOL. The study's primary endpoint was photopic binocular uncorrected visual acuity at distance while also observing visual disturbance as a safety endpoint.

The results of the Registry Study showed that mean photopic binocular uncorrected distance visual acuity (UCDVA) at least three months after AcrySof IQ Vivity® IOL implantation was 0.009 logMAR, which

corresponds to 20/20 vision (Snellen). In terms of safety outcomes, more than 88% of subjects had no visual disturbances of halos, glare, and starbursts at least 3 months after IQ Vivity AcrySof IQ Vivity® IOL implantation. "This is where the AcrySof IQ Vivity® IOL shines," says Dr. Lawless. Other conclusions from the registry showed that most subjects did not need to wear glasses for distance and intermediate tasks, and most subjects reported no difficulty with their everyday life activities.

Dr. Lawless presented a case in which a 63-year-old male patient presented with cortical cataract, corrected distance visual acuity of 6/9 in each eye, slightly disturbed tear film, yet normal topography. The patient achieved plano in the left eye with an implanted Claron® monofocal IOL and -0.75 diopter in the right eye with an implanted Vivity® IOL. The patient reported a 10 out of 10 on a scale of overall quality of vision 3 months after surgery. Looking at uncorrected vision post surgery, the patient's left eye was 6/4.5 (binocular distance), N10 (binocular intermediate), and N12 (binocular near). "That's how a monofocal lens works," said Dr. Lawless. With an uncorrected right eye of 6/7.5 (binocular distance) and N5 for both binocular intermediate and near, Dr. Lawless explained that "the patient was getting more from [the implantations] without the disadvantage of true monovision."

Until recently, in Dr. Lawless's view, a traditional monofocal lens gave great distance vision but poor near and intermediate vision. On the other hand, a

Horses for Courses: Using the Right IOL for the Right Eye

modern trifocal lens gives a real chance of freedom from glasses at all ranges, though with some cost in quality due to all multi- and trifocal lenses having to split light. Thus, extended depth of focus (EDOF) lenses are the “in-betweeners.” Dr. Lawless stated that “until the Vivity™ IOL, you had to accept a compromise. I had to choose what mattered most to the patient and make some nuanced decisions.” Now with the Vivity™ IOL, the options for both surgeon and patient have expanded. The Vivity™ IOL extends the range but retains good, clear optics while offering a seamless transition so that patients do not have to “hunt for the correct focus point.”

In Dr. Lawless’s consulting room, he has choices to make with the Vivity™ IOL. One choice is to aim for normal vision in both eyes (i.e. emmetropia with no refractive error), which will give the best unaided distance while retaining normal binocularity and depth perception. Another choice is to achieve a slight offset in the non-dominant eye. Dr. Lawless, with this choice, will aim for normal distance vision in the dominant eye and a small amount of short-sightedness (about -0.25 to -0.75D) in the other eye. This choice gives the patient a good chance of not needing glasses, though the surgeon cannot always promise that. “Some people will still wear glasses for some near tasks, but they won’t be as dependent on them” says Dr. Lawless. The important thing Dr. Lawless stressed with this choice is that it does not behave as monovision. Both eyes are working together and the extended range of the Vivi-

ty™ IOL allows for a “visual summation” to create a very natural type of vision.

Dr. Lawless also explained that the quality of vision and photic phenomenon is equivalent to a monofocal IOL. Additionally, there is a seamless transition from far to intermediate vision. A slight myopic offset in the non-dominant eye also allows patients the spectacle independence they wish for. “In my experience, this is the first time a lens has been able to provide all of the above.”

The Full Range of Vision Option

Abhay Vasavada, MD, India

When talking about the full range of vision, trifocal IOLs came into the scene to tackle the issue of correcting intermediate vision in patients at an 80 cm distance. For the Asian patient population, intermediate vision may be too far for the average Asian arm span, thus the PanOptix® Toric Trifocal IOL was introduced to solve this problem. The PanOptix® IOL provides intermediate vision at 60 cm instead of 80 cm while providing minimal loss of light to the retina at 3 mm pupil.

Dr. Vasavada stated that the customization of outcomes for patients is important, and surgeons must have a very good understanding of the eye while also understanding the patient and his or her lifestyle. “Questionnaires are a very important tool in judging a patient’s lifestyle for choosing a made-for-you IOL,” says Dr. Vasavada.

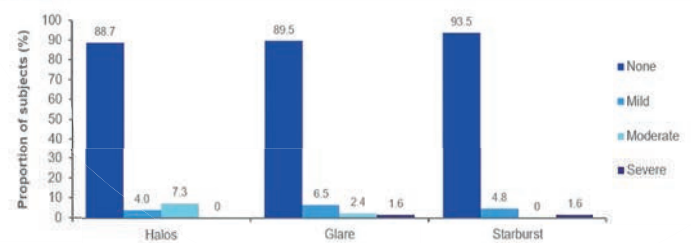
One case Dr. Vasavada presented was of an active 80-year-old female patient with a mainly indoor lifestyle and an enjoyment for reading, though she would often forget where she placed her reading glasses. The patient stated that she would love to get rid of glasses. After examining her ocular profile, Dr. Vasavada determined that she was a suitable candidate for a multifocal IOL and recommended bilateral PanOptix® IOL and advised the patient, after surgery, to read with sufficient light sources. Post surgery, the patient was very happy and achieved spectacle independence. What Dr. Vasavada learned from this case is that “age is not a ‘bar’ for

the PanOptix® IOL. In fact, it improves the quality of life of senior citizens.”

Another case Dr. Vasavada presented was a 35-year-old male engineer with blurred vision and glare at night while riding his motorcycle. His ocular profile showed mild myopia at -1.5 diopters and posterior subcapsular cataract in both eyes. The patient also reported working for several hours at night on the computer. When Dr. Vasavada discussed IOL types with the patient, the patient reported that his friends had warned against multifocal IOLs, though he wished to get rid of his glare. Thus, Dr. Vasavada prioritized the

Visual Disturbance*: Safety Outcomes for the Overall Cohort (n=128)

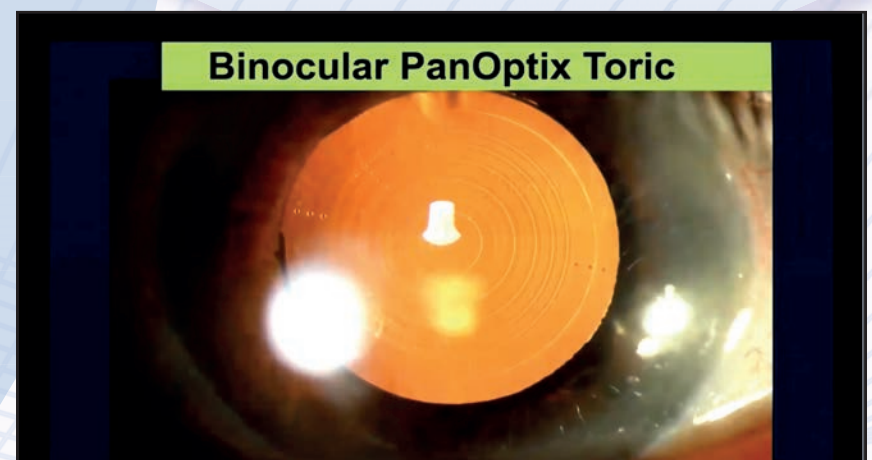
Over the last 7 days, did you experience problems with your vision and how severe if yes?



More than 88% of subjects had no visual disturbances at least ~3 months after AcrySof IQ Vivity™ IOL implantation

First Interim Database Lock Data. *Visual disturbances were evaluated in a non-prompted interview. Alcon Research, LLC. Data on file: ILE871p001 Clinical Study Report, 2021

Safety outcomes were positive with more than 88% of subjects having no visual disturbances after AcrySof IQ Vivity® IOL implantation.



Case presentation with implanted binocular PanOptix® Toric IOL.

patient's distance and intermediate vision, implanting the ReSTOR® IOL in his right eye. After this implantation, the patient was happy with the distance and computer vision, though he was not impressed with his reading ability, wishing for better near vision in his left eye. Dr. Vasavada thus planned to implant the PanOptix® IOL in the left eye, warning the patient not to compare eyes and that he may need to wear glasses for selective activities. Two months after

surgery, the patient reported achieving a practical and successful outcome. He was able to ride his motorcycle with no glare in his vision while hardly having to use glasses.

In a third case, Dr. Vasavada presented a 60-year-old male patient who is an active ophthalmologist with bilateral cataracts using progressive glasses. The patient himself reported moderate use of multifocal IOLs in his own practice and was keen

on being implanted with multifocal IOLs himself as he had positive experiences with his own patients. The patient reported one month after surgery that he was very happy. He was able to operate on and examine patients, drive, and read without any difficulty. Though he observed halos at night, he reported that it was not bothersome.

Dr. Vasavada stressed that having a forthright discussion with patients preoper-

atively is very important in managing patient expectations and outcomes. Patients also must be motivated to accept some compromises such as occasional spectacle usage or seeing occasional halos. Though picking the right patients is also important in his practice, Dr. Vasavada says he is happy customizing the needs of his patients and emphasizes dedicating enough chair time preoperatively to manage patient outcomes.

NGENUITY® 3D Visualization System Transforms the Surgical Experience Going beyond the limits of visualization

Technological innovations in refractive cataract surgery are constantly evolving, making surgical procedures more efficient for both surgeon and patient. With Alcon's NGENUITY® 3D Visualization System, the operating space is transformed allowing surgeons to go beyond the limits of visualization. The NGENUITY® system provides a high-definition video camera and workstation for 3D visualization of the eye with greater depth and detail during surgery than traditional microscopes. The versatile high dynamic range surgical camera and optimized high-speed image processor allows the surgical team to expand collaboration through a shared heads-up surgical view. Features of NGENUITY® also include personalized color profiles to customize the approach for each patient, light temperature profiles, custom image profiles, and the ability to operate under low lighting conditions.

Using NGENUITY®, Naren Shetty, MD, India found that not only is he more comfortable during surgical procedures, but "patients are so much more comfortable." The reasons for greater comfort are outlined in his publication "Comparison of ease of visualization and comfort during phacoemulsification using NGENUI-

TY® 3D Visualization System versus Standard Operating Microscope."¹ Dr. Shetty and his team aimed to compare the ease of visualization and comfort as perceived by the surgeon while performing phacoemulsification in cataract patients using the NGENUITY® system compared to the standard operating microscope (SOM). In the prospective, randomized study carried out at a single tertiary eye care center, an interim analysis of five experienced surgeons operating on 123 eyes of 123 patients showed many advantages to using NGENUITY®. From their newly developed questionnaire, "Surgeon's Comfort Score" or SCS, the results showed that surgeons experienced a lesser illuminated surgical field with NGENUITY® than with the SOM and this difference was statistically significant. A brighter surgical field, experienced with the SOM, is not desired and may be detrimental to the patient's retina due to phototoxicity. Additionally, all five surgeons reported more comfort with the brightness of the surgical field of NGENUITY® than with the SOM, and this difference was also statistically significant. Finally, three out of five surgeons reported statistically significantly better neck comfort after the surgery while operating on NGENUITY® as compared to the SOM.

With a shallow learning curve, NGENUITY® provides Dr. Shetty with a wonderful experience. "Initially, it looked like using NGENUITY® was going to be difficult, but soon after I began the surgery, I forgot I was looking at the screen. You start and you forget." Additionally, Dr. Shetty remarked that there was no difference in time for cases; he was able to complete eight to nine cases per hour with NGENUITY®. Dr. Shetty also found that patients, because it is important for them to look at the light during surgery, were much more cooperative with the lesser illumination of the surgical field, which allowed for improvements in surgical technique as well as clinical outcomes.

Not only does NGENUITY® benefit surgeons and patients, but it also becomes a superior teaching tool for fellows and residents. When the surgeon is operating, students can clearly see the high-definition screen. "When our students are operating, we don't need to lean to the side [to see]; we can just stand and look at the screen to instruct," says Dr. Shetty. Especially in the current state of the COVID-19 pandemic, the ease of visualization provides a significant advantage with greater distance between surgeon, patient, and staff.

Finally, the ergonomic set-up is important to consider for the surgeon. Every time there is a difference in patient height, the surgeon has to

change the placement of the microscope set-up with the SOM. "With NGENUITY, you don't need to change. You can place the patient's head where you're most comfortable. If the patient's height isn't in the average range when using the SOM, the surgeon has to compromise [with the set-up]," says Dr. Shetty.

The transformative NGENUITY® 3D Visualization System and its powerful depth perception, in Dr. Shetty's words, is "simply amazing." As technology continues to evolve in the refractive and cataract realm, NGENUITY® is a stepping stone for the future of surgical visualization.

FOOTNOTE:

1. Shetty N et al. "Comparison of ease of visualization and comfort during phacoemulsification using NGENUITY® 3D Visualization System versus Standard Operating Microscope." In: Proceedings from the Asia-Pacific Association of Cataract and Refractive Surgeons; July 30-July 31, 2021; Virtual. Abstract PP1-48.

