CASE OF THE MONTH

Optimizing surgical outcomes and increasing cataract workflow efficiency with advanced technology.

By Ramón Ruiz-Mesa, MD

Achieving success in cataract surgery depends on a number of preoperative, intraoperative, and postoperative factors. Preoperatively, evaluation of corneal topography and the acquisition of accurate biometric measurements is fundamental for proper surgical planning and choosing the IOL power that will achieve the targeted refractive outcome. Intraoperatively, completing cataract removal efficiently while maintaining anterior chamber stability favors early and optimal visual recovery by minimizing exposure to ultrasound energy and risk of complications. Achieving and maintaining quality visual outcomes for patients also depends on IOL choice.

Using advanced technology for cataract surgery from ZEISS allows me to achieve these goals and with added benefits of improving workflow efficiency.

**Accurate and efficient preoperative evaluation**

The IOLMaster™ 700 (Carl Zeiss Meditec AG, Jena, Germany) provides critical information for cataract surgery planning, and it does so with a single fast measurement that enhances workflow efficiency. Using swept source optical coherence tomography (SS-OCT) and telecentric keratometry, the IOLMaster 700 measures both anterior and posterior corneal curvatures and uses the information to generate Central Topography and Total Keratometry (TK®) in addition to routine biometric data that are used for IOL power calculation.

The TK measurement provided by the IOLMaster 700 is another valuable feature because of its potential to improve the accuracy of IOL power calculations. Direct measurement of the posterior corneal surface to determine total corneal power is particularly valuable for choosing the correct IOL power in postrefractive surgery eyes and in cases involving toric IOL implantation. The vast majority of cataract surgery patients do not fall into these categories and receive a non-toric monofocal IOL. Variation in the anterior/posterior corneal curvature ratio exists within the normal population, and these outliers are at risk for clinically relevant IOL power miscalculation errors. This information underscores the value of using, the TK measurement routinely for IOL power calculations.

The TK value can be used in either classic IOL power calculation formulas (such as Haigis) or formulas specifically developed to incorporate TK, such as the Barrett TK Universal II. From clinical studies investigating IOL power calculation using TK and other biometric measurements from the IOLMaster 700 show that it results in refractive accuracy that is as good as or better than methods that rely on assumptions or nomograms to adjust for the posterior cornea.

**Enhancing efficiency**

Barriers needed to perform preoperative testing is an important consideration because of its impact on clinic flow and the patient experience. Procedures that offer efficiency without sacrificing accuracy certainly offer an advantage in the setting of a busy clinic, and streamlining patient evaluation has gained importance since the start of the COVID-19 pandemic.

With this in mind, we undertook a prospective study to compare the acquisition times using the IOLMaster 700 with Central Topography, the IOLMaster 700 + the Pentacam® HR (Oculus, Wetzlar, Germany), and the IOLMaster 700 + the Cassini® (Cassini Technologies B.V., Haag, The Netherlands). The measurement protocols were done in random order by a skilled technician in 100 eyes of 100 patients undergoing cataract surgery.

We found that overall, the mean acquisition time was approximately 20 seconds when using the IOLMaster 700 with or without Central Topography, demonstrating that the data used to generate Central Topography maps is obtained as part of a single standard measurement. Using the IOLMaster with a second device to acquire preoperative measurements took approximately 2.5- to 3-fold longer compared to the acquisition times for using the IOLMaster 700 alone. The differences in acquisition times between the protocols were highly statistically significant.

**Intraoperative technology**

The technology used intraoperatively also affects outcomes of cataract surgery. QUATERA 700, the new phacomulsification unit from ZEISS, unlocks a completely new experience in phaco. PHACO 700 provides digitally integrated surgical workflow by connecting your OR-devices for more efficiency. One data logger and one sterile cockpit allows you the integration of patient data from IOLMaster and the combination of ZEISS CALLISTO eye workflow steps and phaco steps in one workflow. Control the full surgical workflow from the sterile zone (Phaco steps, ZEISS CALLISTO eye assistance functions, patient data for timeout check, microscope image) means faster anticipation of and reaction to surgical steps and less interaction with other devices.

In addition, QUATERA 700 minimizes ultrasound energy by delivering power only when it is needed. It features a new patented pump (QUATTRO Pump®) – a synchronized fluid exchange system with direct control of aspiration and infusion and active incision leakage volume compensation providing chamber stability independent of IOP and flow. Leading to a more relaxed surgery that allows surgeons and their team to focus on the essence and to perform surgery with maximum efficiency from day one.

The majority of patients undergoing cataract surgery receive a non-toric monofocal IOL. In these cases, choosing the CT LUCIA® 621 IOL (Carl Zeiss Meditec AG) increases my confidence for achieving excellent outcomes and patient satisfaction. The CT LUCIA 621 comes preloaded in a single-use injector system (BLUESERT™) that enables intuitive and efficient delivery. Thanks to its material and design, the CT LUCIA 621 provides high quality vision, has excellent refractive stability and low PCO.

**Conclusion**

There are many different technologies that can be used in the planning and performance of cataract surgery. To my experiences, the IOLMaster 700 with all its functionalities, such as Central Topography and TK represents an accurate and efficient tool for collecting the preoperative information that is essential for optimizing surgical decision-making and refractive outcomes. Combined with the new QUATERA 700 for phacomulsification and the CT LUCIA 621 IOL, I feel I am choosing the best technologies the market has to offer.

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