More Physiologic IOP Matters



Performing cataract surgery at more physiologic IOP is beneficial for surgical outcomes without sacrificing efficiency.

BY ZAINA AL-MOHTASEB, MD; RICHARD L. LINDSTROM, MD; CATHLEEN M. MCCABE, MD; AND ELIZABETH YEU, MD

With past phacoemulsification platforms, technical limitations necessitated performing cataract surgeries above physiologic IOP to ensure anterior chamber stability. However, higher levels of IOP may have undesirable clinical ramifications including increased anterior chamber turbulence and corneal edema.[1] "Thanks to recent technological advancements, the CENTURION® Vision System with ACTIVE SENTRY® (Alcon) maintains more physiologic IOP during cataract surgery without compromising the stability of the anterior chamber," explained Richard L. Lindstrom, MD. During the recent ASCRS meeting, four esteemed cataract surgeons shared their experiences performing surgery at more physiologic IOP.

BENEFITS OF MORE PHYSIOLOGIC IOP

Corneal Protection

"Research[1] suggests that operating closer to a physiologic IOP leads to reduced corneal edema and anterior segment inflammation compared to traditional high pressures used in surgery," Zaina Al-Mohtaseb, MD, pointed out.

In a recent prospective, randomized, paired-eye clinical trial of 27 patients scheduled for bilateral cataract surgery using the CENTURION® Vision System with ACTIVE SENTRY®, Rauen et al treated one eye at low IOP (≤28 mm Hg) and one eye at high IOP (≥55-60 mm Hg). The eyes that received more physiologic IOP showed smaller increases in corneal thickness, a smaller decrease in endothelial cell density, and less corneal edema at day 1 and week 1 postoperatively.[1]

Anterior Chamber Stability

CENTURION® Vision System with ACTIVE SENTRY® uses compression plates to regulate pressure on the Balanced Salt Solution (BSS®) irrigating solution bag, while sophisticated pressure sensors enable Active Fluidics™ to sense intraoperative changes in IOP and provide real-time feedback for adjusting fluid flow.

Patient Comfort

Various steps during phacoemulsification and lens implantation can be sources of pain for some patients.[2] "In my experience, patients who are high myopes can be pretty uncomfortable during the procedures," explained Cathleen M. McCabe, MD.

Maintaining a more physiologic IOP supports patient comfort during surgery. The CENTURION® Vision System with ACTIVE SENTRY® actively controls IOP to minimize concerns over fluctuating pressure. By prioritizing IOP control, this system allows for higher flow rates without the risk of pressure drops, ensuring chamber stability and surgical confidence throughout the procedure. In a study published this year, patients who received cataract surgery at more physiologic IOP (30 mm Hg) with the CENTURION® Vision System with ACTIVE SENTRY® reported lower subjective pain perception than those treated with the same system at an IOP of 80 mm Hg.[3]

Surgical Efficiency

"I have noticed shorter phacoemulsification time and easier nuclear disassembly. Operating at more physiologic IOP has not compromised but enhanced my surgical efficiency," said Elizabeth Yeu, MD.

In the past, phacoemulsification systems required a compromise between lower IOP and surgical efficiency.

However, recent data on the CENTURION® Vision System with Active Sentry® showed no difference in total ultrasound time or total aspiration time during low-IOP surgery compared to high-IOP surgery.[3]

The ACTIVE SENTRY® Handpiece signals the CENTURION® Vision System to maintain target IOP via continuous

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fluidic adjustments. This fluidic stability enables surgeons to use higher aspiration and vacuum levels, leading to efficient fragment removal with reduced repulsion, energy, and aspirated fluid.

BENEFITS TO THE POSTERIOR SEGMENT

The posterior segment also benefits from more physiologic IOP cataract surgery. Scarfone et al showed that higher IOP during surgery with the CENTURION® Vision System increases the likelihood of positive Berger space postoperatively, which is a biomarker of changes in the vitreous-lens interface and mechanical stress on the peripheral retina.[3]

CONCLUSION

The ACTIVE SENTRY® Handpiece and the CENTURION Vision System work together to minimize IOP fluctuations and surge during surgery. These enhanced fluidics provide the surgeon with a high level of control over each case with the goal of enhancing procedure safety and patient comfort while retaining efficiency. ■

1. Rauen MP, Joiner H, Kohler RA, O'Connor S. Phacoemulsification using an Active Fluidics System at Physiologic versus High IOP: Impact on Anterior and Posterior Segment Physiology. *J Cataract Refract Surg*. Published online April 8, 2024.
2. Hou C h, Lee J s, Chen K j, Lin K k. The sources of pain during phacoemulsification using topical anesthesia. Published online 2012.
3. Scarfone HA, Rodriguez EC, Rufiner MG, Riera JJ, et al. Vitreous-lens interface changes after cataract surgery using active fluidics and active sentry with high and low infusion pressure settings. *J Cataract Refract Surg*. 2024;50(4):333.

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Important Safety Information

CENTURION® VISION SYSTEM IMPORTANT PRODUCT INFORMATION

Caution: Federal (USA) law restricts this device to sale by, or on the order of, a physician. As part of a properly maintained surgical environment, it is recommended that a backup IOL injector be made available in the event the AutoSert® IOL Injector Handpiece does not perform as expected.

Indication: The CENTURION® Vision system is indicated for emulsification, separation, irrigation, and aspiration of cataracts, residual cortical material and lens epithelial cells, vitreous aspiration and cutting associated with anterior vitrectomy, bipolar coagulation, and intraocular lens injection. The AutoSert® IOL Injector Handpiece is intended to deliver qualified AcrySof® intraocular lenses into the eye following cataract removal. The AutoSert® IOL Injector Handpiece achieves the functionality of injection of intraocular lenses. The AutoSert® IOL Injector Handpiece is indicated for use with the AcrySof® lenses SN60WF, SN6AD1, SN6AT3 through SN6AT9, as well as approved AcrySof® lenses that are specifically indicated for use with this inserter, as indicated in the approved labeling of those lenses.

Warnings: Appropriate use of CENTURION® Vision System parameters and accessories is important for successful procedures. Use of low vacuum limits, low flow rates, low bottle heights, high power settings, extended power usage, power usage during occlusion conditions (beeping tones), failure to sufficiently aspirate viscoelastic prior to using power, excessively tight incisions, and combinations of the above actions may result in significant temperature increases at incision site and inside the eye, and lead to severe thermal eye tissue damage. Good clinical practice dictates the testing for adequate irrigation and aspiration flow prior to entering the eye. Ensure that tubings are not occluded or pinched during any phase of operation. The consumables used in conjunction with ALCON® instrument products constitute a complete surgical system. Use of consumables and handpieces other than those manufactured by Alcon may affect system performance and create potential hazards.

AEs/Complications: Inadvertent actuation of Prime or Tune while a handpiece is in the eye can create a hazardous condition that may result in patient injury. During any ultrasonic procedure, metal particles may result from inadvertent touching of the ultrasonic tip with a second instrument. Another potential source of metal particles resulting from any ultrasonic handpiece may be the result of ultrasonic energy causing micro abrasion of the ultrasonic tip.

ATTENTION: Refer to the Directions for Use for the accessories/consumables and Operator's Manual for a complete listing of indications, warnings, cautions and notes.

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