

# Vitreous!

One surgeon's education on how to manage the vitreous.

BY ROBERT H. OSHER, MD

Every cataract surgeon eventually encounters a situation in which either a planned or an unplanned anterior vitrectomy is necessary. Perhaps pre-existing trauma has torn the zonules, and vitreous is evident in the anterior chamber. Alternatively, the posterior capsule may have torn, and the anterior hyaloid face has ruptured, with vitreous presenting at the incision site. Any surgeon who operates must be capable of managing the vitreous. This article provides a brief overview of my own education in this area.

## PERSONAL HISTORY

I have been lucky in my ophthalmic training for many reasons. At the Bascom Palmer Eye Institute in Miami, I had the opportunity to learn “emergency” vitreous techniques from David Kasner, MD, the father of vitrectomy. His gifted vision led to the breakthrough concept of vitrectomy, which was developed and introduced by another member of the faculty, Robert Machemer, MD. Dr. Kasner insisted that every resident become comfortable with a Weck cell vitrectomy, in addition to the technique of pars plana vitreous aspiration.

In the early 1980s, surgeons routinely placed an irrigating “Charles” sleeve around the cutting/aspirating needle. During my first officially invited presentation at the AAO, I drew criticism by advocating the elimination of the “Charles” sleeve, because I believed it made no sense to pour fluid into the vitreous cavity, adjacent to the same port intended for cutting and aspiration. Rather than turn an eye into something resembling a collapsed grape, I suggested a “minimal” bimanual vitrectomy to remove only the vitreous that invaded the anterior segment. I separated the infusion cannula from the cutting/aspiration port, and introduced it through a second stab incision at the corneoscleral junction. Further challenging the accepted dogma, I recommended placing the IOL inside the torn capsular bag if there were adequate equatorial support rather than implant an anterior chamber IOL. I was not invited back for years!

In 1987, a magnificent study of vitreous anatomy by Jan Worst, MD, of Haren, the Netherlands, appeared in the *Video Journal of Cataract and Refractive Surgery*.<sup>1</sup> This incredible video demonstrated the predictable structure,

support, and vital role of the vitreous gel, and it thereby confirmed my belief that less is better when dealing with vitreous prolapse.

During the early 1980s, my colleagues and I learned to work with the vitreous and became able to restrain it via viscoelastic tamponade.<sup>2</sup> I began injecting viscoelastic material to provide support behind either a descending nucleus or a subluxed IOL.<sup>3</sup> Subsequently, David Chang, MD, and Richard Packard, MD, refined the technique by using a pars plana entry for the injection of a dispersive viscoelastic.<sup>4</sup>

My vitrectomy technique continued to evolve in the mid-1980s, when Kimiya Shimizu, MD, a pioneering cataract surgeon from Kanagawa, Japan, first showed me the technique of dry vitrectomy. I was able to fill the anterior segment with Healon (Pfizer Inc., New York, NY), place the cutting/aspiration device through the viscoelastic material, and accurately remove the offending vitreous within a stable chamber.<sup>5</sup> Next, Roger Steinert, MD, of Boston and Doug Koch, MD, of Houston taught me the concept of pars plana vitrectomy for the cataract surgeon. Rather than pull the vitreous forward, this technique draws the vitreous posteriorly. After my initial feelings of intimidation about placing a blade through the pars plana gradually diminished, I added this option to my vitrectomy armamentarium, spurred on especially by a technique for staining the vitreous with triamcinolone that was developed by Scott Burk, MD, and Andréa DaMata, MD, both of Cincinnati. After it received the grand prize at the ESCRS film festival, their video was published in the *Video Journal of Cataract and Refractive Surgery*.<sup>6</sup>

The most significant improvement in my own vitrectomy skill occurred when Alcon Laboratories, Inc. (Fort Worth, TX) introduced the INFINITI Vision System in 2003. Never before had I enjoyed such exquisite and predictable control at my fingertips. The probe houses a pneumatic mechanism that applies pressure to a diaphragm, thereby causing the cutter to slice down a 20-gauge needle, closing the port, and cleanly cutting vitreous. Releasing the pneumatic drive pressure allows a spring to return the cutter and diaphragm to their original positions, opens the port, and allows the cut vitreous to be aspirated while more vitreous moves into the port. Repeating the cycle provides continuous cutting and aspiration of vitreous at an im-

pressive adjustable rate of 800 cuts per minute. I prefer an aspiration rate of 25 mL per minute and a vacuum of 250 mm Hg, which, because of advanced fluidics, maintains a stable chamber while the vitreous disappears in record time. The probe can be used, not only with the INFINITI Vision System, but also with the Accurus system (Alcon Laboratories, Inc.), the machine most frequently used in posterior vitrectomy. Moreover, by choosing the cut-I/A option rather than the I/A-cut mode, the vitrectomy becomes a safer procedure, because the vitreous is cut before it is aspirated.

## CONCLUSION

It is hard to believe how far cataract surgeons have come from the days of the Weck cell sponges. Anterior vitrectomy techniques and instrumentation have never been better, and improved surgical results reflect our progress. ■

*Robert H. Osher, MD, is a professor in the Department of Ophthalmology at the University of Cincinnati College of Medicine and is Medical Director Emeritus at the Cincinnati Eye Institute in Ohio. Dr. Osher is also the founder and editor of the Video Journal of Cataract and Refractive Surgery. He is a consultant with Alcon Laboratories, Inc., and Pfizer Inc. Dr. Osher may be reached at (513) 984-5133; rhosher@cincinnatieye.com.*



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