The role of contact lenses in glaucoma drug delivery

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Contact lenses as drug delivery systems hold the promise of being a convenient, efficacious therapy whereby the drug has increased contact time with the eye leading to enhanced bioavailability. Options for drug delivery via contact lens currently being studied in vitro include: lens soaking, incorporation of drug-loaded nanoparticles, and molecular imprinting procedures.

With lens soaking, a hydrated hydrogel lens uptakes a water-soluble glaucoma medication solution. While this could result in sustained and extended release from the lens, it could also result in a quick and unpredictable release. Incorporation of drug-loaded nanoparticles into the lens matrix has been suggested as a way to control this release. With molecular imprinting, high-affinity drug binding sites are created within the lens matrix. Release of the drug can be prolonged by altering the components of the lens matrix.

To gain some further perspective on glaucoma drug delivery systems, I sat down with Michael Chaglasian, O.D., chief of staff of the Illinois Eye Institute and noted glaucoma lecturer. Dr. Chaglasian suggests the bulk of new research in drug delivery systems is actually in other forms of drug delivery, such as injectable inserts. These may be more likely to gain favor in the future due to ease of use and patient compatibility. Dr. Chaglasian noted there are unique challenges that glaucoma patients present when compared to a normal cosmetic contact lens wearer: advancing age, concomitant ocular surface disease, and issues with adherence to therapy. He notes it will likely be “an uphill hurdle for contact lens delivery systems to work on glaucoma patients.” However, it should be noted that any surgically implanted device will also carry risks.

With quite a few academic centers, medical technology start-ups, and contact lens companies evaluating such drug delivery systems, is this something we may see in the future? Certainly, the U.S. Food and Drug Administration clinical trials involving the Sensimed Triggerfish device for continuous intraocular pressure monitoring have sparked interest in contact lenses as treatment and monitoring strategies for glaucoma. Despite all the promise, drug delivery contact lenses for glaucoma will surely still require diligent patient selection, careful follow-up and extensive patient education in order to prevent both drug-related and device-related complications.

References:

Dr. Sicks received her Doctor of Optometry degree from the Illinois College of Optometry. She completed a Cornea and Contact Lens residency program at Northeastern State University Oklahoma College of Optometry. Dr. Sicks is currently an assistant professor at the Illinois College of Optometry, where she participates in didactic, clinical, and research activities.

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