Treating, eliminating negative dysphotopsia

by Vanessa Caceres EyeWorld Contributing Writer

The best way to treat negative dysphotopsia remains a hot topic among surgeons. Negative dysphotopsia that occurs right after cataract surgery is usually best left to resolve on its own. However, if the problem continues a few months after surgery, ophthalmologists must step in to provide a treatment. Their treatment approach usually depends on what they suspect is the cause.

Looking at causes

Negative dysphotopsia appears in patients as a temporal crescent-shaped shadow after in-the-bag IOL implantation following cataract surgery. It was first reported in 2000 by James Davison, MD, cataract and refractive specialist, Wolfe Eye Clinic, with locations throughout Iowa. Dr. Davison said he observed the phenomenon with acrylic square-edge IOLs, which were introduced in the 1990s as a way to prevent posterior capsule opacification. "There's controversy with the exact mechanism of action," said David V. Folden, MD, North Suburban Eye Specialists, Minneapolis. "I think more physicians and data would support the fact that it's ultimately the sharp posterior optic edge design of the modern-day IOL that's likely the culprit."

Other suggested factors include an IOL's high index of refraction, transparency of the peripheral nasal capsule, and type of incision used during surgery.

The immediate postop incidence for negative dysphotopsia appears to be around 20%, said Samuel Masket, MD, in private practice in Los Angeles, and clinical professor of ophthalmology, Jules Stein Eye Institute, David Geffen School of Medicine, University of California, Los Angeles. However, long-term chronic dysphotopsia complaints are closer to 1.5% to 3%, Dr. Masket said.

Surgeons cannot yet predict who will experience negative dysphotopsia, said Jack T. Holladay, MD, clinical professor of ophthalmology, Baylor College of Medicine, Houston.

Dr. Holladay wrote an article in 2011 that used ray tracing diagrams to explain negative dysphotopsia. "The peripheral arcuate shadow that patients see is the result of square-edge optics causing a refraction of the rays that pass through the edge of the lens that go in opposite directions (leaving a blind spot), and that creates a shadow. That always happens. If that shadow falls anterior to the functional retina, then you can't see it. If it falls on the functional retina then you'll see it," he said.

"Not everyone's peripheral retina is at the same point. People who have a functional retina extending far anteriorly will have a higher chance of experiencing this than people who don't," Dr. Holladay said. "We have no clinical way of determining how far a patient's functional retina goes."

However, Dr. Holladay added that if someone experiences negative dysphotopsia in one eye, it's more likely that he or she will experience it in the fellow eye as well.

Available treatments for negative dysphotopsia

The first recommended treatment for negative dysphotopsia is observation. "Observation is a great first step. Ultimately, we think the capsule peripheral to the optic edge on the nasal side clouds over time, increasing light scatter into that shadow, and that eliminates the negative dysphotopsia," Dr. Folden said.

If the patient still has the problem 3 to 4 months later, the use of thick-framed glasses or a trial dilation can take place, Dr. Folden said. However, not many patients want to use thicker frames, and dilation is good for diagnosis but not for treatment, he cautioned. Even if patients must wait a few months before treatment, Dr. Masket reassures them what they are experiencing is a legitimate—and bothersome—visual phenomenon.

A treatment approach published recently by Dr. Folden in one report and David L. Cooke, MD,
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Great Lakes Eye Care, St. Joseph, Mich., in a separate report is the use of a neodymium (Nd):YAG laser anterior capsulotomy.

Dr. Folden’s study focused on six months of follow-up with negative dysphotopsia, five of whom had an Akreos AO M160 posterior chamber (PC) IOL (Bausch + Lomb, Rochester, N.Y.); symptoms completely resolved in three patients and partially resolved in one patient. In one patient who had an AcrySof IOL (Alcon, Fort Worth, Texas), symptoms did not go away.

“Because the anterior capsulotomy did not resolve the symptoms in the patient with the AcrySof IQ toric PC IOL, the anterior capsule should be considered an optical risk factor and negative dysphotopsia important in the manifestation of symptoms in only some patients,” Dr. Folden wrote. This approach is conservative, Dr.Folden said.

Dr. Cooke’s report focused on negative dysphotopsia that was present in a patient 2 months after receiving a toric plate-haptic IOL that resolved after Nd:YAG removal of a portion of the nasal anterior capsule. The anterior capsule has a large, curved geometry of translucency and potential for light scatter even immediately following surgery. Light scatter occurs through the anterior capsule may provide a route for light to reach the sharp posterior optic edge resulting in shadow creation. Although the capsule peripheral to the edge of the optic can become oval over time, the anterior capsule can contribute to symptoms, and if so, may respond well to Nd:YAG laser anterior capsulotomy.

“In our articles, Dr. Folden and I dramatically improved most cases of negative dysphotopsia with YAG anterior capsulotomy,” Dr. Cooke said. He added that the patient who still had symptoms in Dr. Folden’s report had a toric IOL where the haptics were oriented horizontally instead of vertically. However, Dr. Folden emphasizes that all patients in these two articles received IOLs that had either 360 degrees of sharp posterior optic edge or optic edge discontinuity (as the optic-haptic junction or in the plate-haptic IOL), all capable of shadow creation regardless of orientation inside the eye. “Unfortunately, some mystery still remains on this topic,” Dr. Cooke said.

Other possible treatments for negative dysphotopsia reported by Dr. Market and Nicole Fram, MD, Los Angeles, have included the use of a piggyback IOL, a reverse optic capture procedure, and bag for sulcus IOL exchange. Dr. Market and Fram found piggyback IOL implantation and reverse optic capture were the most successful approaches in their study, leading to complete or partial resolution within three months. These results led them to believe that symptoms depend on IOL coverage of the anterior capsule edge. Their study, which included UBM analyses, did not support the concept that increased posterior chamber depth was a causative factor for negative dysphotopsia. Another finding from Dr. Market: “We’ve found that negative dysphotopsia can occur with any lens so long as it’s in the capsular bag,” she said.

Dr. Market and H. Burkhard Dick, MD, chairman, University Eye Health Care Professional Information Sheet – All patient information is provided as a service to patients and families. This information should not be considered as medical advice or as a substitute for medical advice. This information may be used for educational purposes, and does not constitute advertising or solicitations for medical services. This information should be used in conjunction with the advice and supervision of qualified medical personnel. This information may not be reproduced in any form without the express written permission of Abbott Medical Optics. Dr. Market and Fram found piggyback IOL implantation and reverse optic capture were the most successful approaches in their study, leading to complete or partial resolution within three months. These results led them to believe that symptoms depend on IOL coverage of the anterior capsule edge. Their study, which included UBM analyses, did not support the concept that increased posterior chamber depth was a causative factor for negative dysphotopsia. Another finding from Dr. Market: “We’ve found that negative dysphotopsia can occur with any lens so long as it’s in the capsular bag,” she said.

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Managing multifocal IOL dysphotopsia

by Ellen Stodola EyeWorld Staff Writer

Oncne issue for patients receiving multifocal IOL implants is the potential for dysphotopsias, which can be bothersome and sometimes affect vision. Richard Tipperman, MD, Wills Eye Hospital, Philadelphia; John Berdahl, MD, Vance Thompson Vision, Sioux Falls, S.D.; Audrey Talley Rostov, MD, cornea, cataract, and refractive surgeon and partner, Northwest Eye Surgeons, Seattle; and Douglas Katsev, MD, Sarsum Clinic, Santa Barbara, Calif., commented on dysphotopsias and how to address them in multifocal IOL patients.

Dysphotopsias can be a potential problem after surgery, especially with multifocal IOLs

Dysphotopsias can occur with all types of IOLs but may be more common with multifocals. Many adapt to dysphotopsias, but in severe cases, a lens exchange may need to be performed. Choosing the right candidate for a multifocal at the onset is important.

Characterizing dysphotopsias

“One of the things you want to do is characterize them as positive dysphotopsias or negative dysphotopsias,” Dr. Berdahl said. “Positive dysphotopsias are things like glare, halos—something that you see. A negative dysphotopsia is more like a shadow, something you’re missing that you feel like you should see.”

He said that negative dysphotopsias can occur with any type of lens, but positive dysphotopsias are more common with multifocal IOLs. Dr. Talley Rostov said that dysphotopsias can occur with both multifocal and monofocal IOLs. “What’s more troublesome are the dysphotopsias of the typical glare and halos, especially with the multifocal IOLs,” she said. In a small number of patients, these can be so disabling that the physician needs to do a lens exchange.

Typically, dysphotopsias from multifocal IOLs are circles or rings around light, Dr. Tipperman said. It is important when evaluating patients to get a clear description of what they are seeing. He said patients oftentimes come in with pictures or drawings to illustrate. “Until you can understand it and categorize it, you can’t even begin to treat it,” he said.

Causes

Dr. Katsev said dysphotopsias are light rays that are altered to create an image that falls incorrectly on the retina, and this alteration causes visual complaints in some patients. “They are often caused by the edge of the lens, imperfections in the lens, as well as the diffractive or refractive aspect of the multifocal lens,” he said. “As for the premium IOLs, a zonal refractive lens will result in the most complaints, especially early in the recovery process.” “Dysphotopsias may be permanent but always soften with time,” Dr. Katsev said. “Most often they decrease to a very tolerable level and may even go away.”

Dr. Berdahl said that when using a multifocal IOL, it’s important for the optical system to be pristine. “A multifocal IOL splits light and therefore decreases contrast sensitivity,” he said. “Anytime there is a change in a structure at the interface then there’s an opportunity for light to be scattered. Multifocal IOLs purposely have changes in them, the rings that are on the IOLs, and when the light hits, it can be scattered, leading to glare or halos. So part of it is the IOL itself,” he said. “The second part of it is that light is traveling through a more complex optical system in general.” Therefore, if there is some light scatter from an irregular cornea, anterior basement membrane dystrophy, or another condition, this light scatter can reach an intolerable point when paired with a multifocal IOL.

“Part of it is choosing the right candidate for a multifocal IOL at the onset,” Dr. Talley Rostov said. It’s important to ask about the patient’s occupation. If the patient will be doing a lot of night driving, he or she might not be the best candidate for a multifocal IOL. It’s important to look for uncorrected astigmatism preoperatively as well as any refractive error because they could contribute to dysphotopsias.

“Another thing to look for is any dry eye. Make sure that the ocular surface is healthy because the first thing that we get to is the tear layer when we’re looking at how light is refracted by the eye, so any ocular surface disease can certainly be problematic for the patient. If there is ocular surface disease, that needs to be adequately treated because it can either change the refraction and/or cause some dysphotopsia,” Dr. Talley Rostov said.

Counseling patients

Dr. Berdahl explains to his patients that multifocal IOLs are the best technology to make them spectacle