Cataracts and AMD
January 25, 2017
Transcript of Teleconference with Dr. Joshua Dunaiief

Please note: This Chat was edited for clarity and brevity.

MICHAEL BUCKLEY: Hello, I am Michael Buckley from BrightFocus Foundation, and I’d like to welcome you to today’s BrightFocus Chat. Today’s topic is “Cataracts and AMD.” Today’s speaker is Joshua Dunaiief, an assistant professor from the Department of Ophthalmology, School of Medicine, at the University of Pennsylvania.

If the name sounds familiar to you, we have been fortunate to have had him on a few previous Chats, and he also writes articles on our website, www.BrightFocus.org.

For those of you who are new today to our Chat, thank you for joining us. I’m going to tell you a little about BrightFocus and why we are here today.

BrightFocus Foundation funds some of the top researchers in the world. We support scientists who are trying to find cures for macular degeneration, glaucoma, and Alzheimer’s. We share the latest news from these scientists with families who are impacted by these diseases. We have a number of free publications and plenty of materials on our website, www.BrightFocus.org, which offer tips for living with diseases like macular degeneration. Today’s BrightFocus Chat is one way that we share the latest news from science with families.

Today we are talking about cataracts. Over 3 million Americans have cataract surgery each year. BrightFocus receives many questions about age-related macular degeneration (AMD) and cataracts. Many boil down
to a common question, “How can my cataracts affect my AMD, and vice versa?” So to start, Dr. Dunaief, will you tell us a little bit about cataracts?

DR. DUNAIEF: Sure, Michael. I’m happy to be with you again. Cataracts are cloudiness of the lens inside the eye. The eye is like a camera; it has a lens that focuses the light, and over time the lens can become cloudy, which blocks the light. That makes it more difficult to read street signs, to see in the distance, to read up close. It can be a little different from person to person. For some, they may see halos, glare, or round light. For other people, it may look darker and more difficult to read.

MICHAEL BUCKLEY: How do cataracts form?

DR. DUNAIEF: Over time, there is some damage to the lens caused by free radicals, primarily. There are proteins in the lens called crystallins, that normally—as their name suggests—keep the lens crystal clear, but free radical damage can cause those to detach from each other, which causes the lens to become cloudy. That damage typically doesn’t get repaired.

MICHAEL BUCKLEY: Is that damage something that would show up as a symptom or a warning sign?

DR. DUNAIEF: Yes, it becomes more difficult to read or to drive, to see street signs, and read things up close. Patients tend to see glare or halos. The ophthalmologist can see this when you go get an exam under the slit lamp, a device when you put your chin and forehead against the strap. That device allows the ophthalmologist to look into the eye and see the cataract and see how cloudy the lens is.

MICHAEL BUCKLEY: When you have been with us on previous Chats, we have talked about the intersection of lifestyle and diet with macular degeneration. Is there a lifestyle or diet impact on cataracts that may help prevent getting them or make them not as bad?

DR. DUNAIEF: It’s known that ultraviolet light can get into the eye and hit the lens and cause some of the free radical damage to the lens, so sunglasses that block ultraviolet light—or even regular glasses that have
ultraviolet blocking coating added to them—probably would reduce the risk or progression of cataracts. It’s also likely that eating a healthy diet rich in fruits and vegetables would decrease the risks of cataracts, although there is less evidence proving that. That is just kind of intuitive.

**MICHAEL BUCKLEY:** I know in the past we have talked about how macular degeneration is age-related. Are cataracts age-related?

**DR. DUNAIREF:** Yes, they are. It is very unusual for younger people to have cataracts, and it is very common among people in their 70s and 80s and up—to have cataracts. There are some things that can cause cataracts in younger people or cause them to progress more rapidly in older people. Those include steroid use. For people who have to take steroid medicine in either eye drops or pills, they have a specific type of cataracts develop. Also, the people who are diabetic are more likely to get cataracts earlier because of the high blood sugar, as high blood sugar causes changes to the lens.

**MICHAEL BUCKLEY:** Is there a genetic risk for cataracts?

**DR. DUNAIREF:** There are some genes that can cause even babies to get cataracts. Those would be important to look out for among children or grandchildren. What you’d see when you take a picture, you see the red reflection in the pupil that may be an indicator that the lens is clear. If the lens is cloudy because of a mutation in the gene that affects the lens, then the pupil will look white. It is important to notice that in babies, because cataracts need to be removed quickly in order for the visual system to develop properly.

**MICHAEL BUCKLEY:** That is very helpful, I appreciate that. The recurring question we get here all the time is do cataracts make someone’s AMD worse? Also, does someone’s AMD make their cataracts worse?

**DR. DUNAIREF:** Yes, we get that question a lot. They both make the vision worse but independent of each other.

Cataract affects the lens, which is just inside the front part of the eye, and AMD affects the retina, in the back of the eye. There are two distinctive
diseases affecting two distinctive parts of the eye. All the evidence points to these two diseases not impacting each other. However, when a patient has both cataracts and AMD, both of those diseases can reduce vision, and removing the cataracts may improve vision in someone who has AMD by letting more light into the eye.

**MICHAEL BUCKLEY:** We have already started to get questions in today that are related to how to get cataracts treated. Elizabeth in Massachusetts was wondering if it’s true you cannot get cataract surgery when also getting treatments for wet AMD?

**DR. DUNAIEF:** No, it is possible to have cataract surgery while getting treatments for wet AMD. The standard of care for wet AMD is to get injections into the eye, usually every 4 to 6 weeks, with a medication that blocks a protein called vascular endothelial growth factor (VEGF). There are three different medications that are currently being used, Lucentis®, EYLEA®, and Avastin®. As far as clinical trials show, they all work similarly well to each other. Patients who are getting these injections can actually have cataract surgery. The timing of the cataract surgery is important to consider both with the cataract surgery and the retina doctor who is giving the injections.

So one line of thinking is that it is good to have the cataract surgery about 1 week before the next injection. That way, the cataract surgery isn’t diluting out medication that was put in, and also the levels of the medication on the low side at the time of the cataract surgery theoretically might affect healing after the cataract surgery. I think having the cataract surgery 1 week before the next injection is a good strategy.

**MICHAEL BUCKLEY:** Another question we have is wondering about cataract surgery itself—is there a difference between cataract surgeries versus removal by laser?

**DR. DUNAIEF:** Yes, cataract surgery for the past several decades has been done with the technique called phacoemulsification—was a fancy word for ultrasound, a device bringing ultrasound energy into the eye. What happens is the cataract develops as the lens becomes hard, and in order to remove it, it is necessary to break it up into little pieces, and that can be
done with the ultrasound energy, and the little pieces are actually vacuumed out of the eye with this tiny device.

There is a new approach, which involves a laser that can fragment the lens with a laser—sounds like a fancy approach and may eventually lead to better outcomes, but as far as we can tell at this point, there is no difference in the outcomes of the phacoemulsification approach and the laser approach.

**MICHAEL BUCKLEY:** That is good to know. Another question is when patients are working with their doctor about when or if to have cataract surgery, is there a general guideline indicating at what stage of growth of cataracts is the right time to do the surgery?

**DR. DUNAIEF:** My patients will often ask me, “Are my cataracts right?” What I will say to that is how does your vision feel to you? Can you drive? Can you read? Can you do the things that you need to do with your current vision? That applies to someone with macular degeneration or even without it who has cataracts. Cataract surgery is generally very safe, among the safest surgeries that can be done. There is still a small risk, so if the patient doesn’t need cataract surgery, we do not do it. The need, again, is really determined by the patient in terms of what you need to do for your activities of daily life.

Now for somebody with AMD, that question becomes a little more complicated because I can see a cataract during an exam with a slit lamp, and I can see macular degeneration in the retina, but I don’t necessarily always know how much of the vision loss experienced by the patient is coming from the cataract—the cloudy lens versus the degeneration in the retina.

One technique that I find very helpful is something called a potential acuity meter (PAM). A PAM is a device that is able to project an eye chart through a cataract onto the retina, and if the patient can read the eye chart, that is a good indication that the retina is in pretty good shape and the lens is actually the problem—that’s what’s blocking a lot of the vision.
One caveat is that some types of cataracts cannot be penetrated by that PAM device. So if I see that a patient can read the eye chart well with PAM, then I know that the vision will improve after cataract surgery. If the patient can’t read the eye chart well with PAM, that doesn’t necessarily mean that the problem isn’t the cataract. There are some cataracts that don’t let the PAM light through. So it is only helpful under some circumstances. Under other circumstances I have to use my judgment based on how the cataract appears under the slit lamp. How cloudy is it? Where is the cloudiness within the lens? What does the retina look like? And how much degeneration does it have?

MICHAEL BUCKLEY: That is very helpful. A few more questions to wrap up the topic of surgery. If the cataracts are in both eyes, is the surgery done on both eyes at the same time?

DR. DUNAIEF: Typically not—we think that it is safer to do the cataract surgery one eye at a time. Again, the surgery is very safe, but I think it is safer if it is done one eye at a time just in case if there is a problem that occurs, we don’t want it to affect both eyes.

MICHAEL BUCKLEY: Makes sense. The last question on surgery—how quickly does someone heal after cataract surgery? Also, can the cataracts regrow after surgery?

DR. DUNAIEF: Good questions. Modern surgical techniques for cataract removal are really miraculous. Back when my dad was an ophthalmologist, it used to be the patient had to stay in the hospital for a week with their head between sandbags because they couldn’t move their head for fear that they would disrupt the eye. Now the procedures are done through a tiny little incision, and it’s possible because when replacement lenses are put into the eye after the cloudy cataract lens is removed, that replacement lens is made out of plastic or silicone and folded up and put through the tiny incision and unfolded inside the eye, which helps keep the incision so small. Because of those advances, recovery can be very quick.
Some patients notice an improvement in their vision even a day after the surgery. The eye is considered pretty well healed about 4 to 6 weeks after the surgery.

Then you ask can cataracts regrow? The answer is that they can in a sense, so the plastic lens that is implanted in the eye can get covered by cells, and a healing response and those cells can cause the plastic lens to become cloudy. With some patients, it’s necessary to do a quick and painless laser procedure to remove those cells that have grown onto the plastic lens.

MICHAEL BUCKLEY: Thank you. We have a few questions related to the impact on AMD after surgery. Specifically, Joe from Alabama was wondering does AMD worsen after cataract surgery? Or how common is it that AMD worsens after a surgery?

DR. DUNAIEF: There is no evidence that cataract surgery worsens AMD. There have been a number of clinical trials on that issue, and the largest, most definitive clinical trials, including the Age-Related Eye Disease Study, have concluded that cataract surgery does not make AMD worse and does not increase the risk of vision loss from AMD.

MICHAEL BUCKLEY: Great, I appreciate that. Getting back to the AMD cataract surgery, is there any difference if the AMD is wet or dry in terms of having cataract surgery?

DR. DUNAIEF: No, regardless of whether the AMD is wet or dry there is no evidence that cataract surgery makes the situation worse. As we discussed a little earlier, when AMD is wet it’s a little bit trickier to figure out the timing of the cataract surgery, and it needs to be coordinated between the cataract surgeon and retina specialist in terms of when they feel the cataract surgery is safe relative to the injection schedule.

MICHAEL BUCKLEY: That is good to know. We hear people talk about a having a hole in their eye, and they could have cataract surgery. Can you explain a little more about what they mean when they say they have a hole in their eye and how that would relate to cataracts?
DR. DUNAIEF: What we are talking about is a macular hole, which is a different disease from AMD. It happens in some people when the vitreous jelly in the center of the eye tugs on the retina and causes some tactical forces that eventually lead to the formation of a hole—unfortunately right in the center of the macula—that can potentially be very disruptive to vision. For patients with a macular hole, they are followed by the ophthalmologist, the retina specialist, and they have images taken called optical coherence tomography (OCT) images.

This gives us a beautiful cross-section of the retina, showing us exactly where the hole is and how big it is, enabling us to follow the progression of the hole over time. If the hole gets big enough and interferes with vision, then there is a macular hole repair surgery that can be done. That involves taking out the vitreous jelly in the center of the eye and peeling cells off the retina sometimes that are causing forces and usually putting gas into the retina that helps to seal the hole. The gas eventually reabsorbs but puts pressure on the retina for a period of weeks as the hole is healing.

How does this relate to cataracts? Many times the surgery for a macular hole will cause cataracts to advance. Sometimes cataract surgery is done at the same time as the macular hole surgery. If not, it usually needs to be done within a few years of the surgery because the cataracts are likely to progress after the surgery.

MICHAEL BUCKLEY: That is good to know. We have a few questions about looking forward to the future. So, Dr. Dunaief, I know that you are very experienced in the field of research, and I wanted to ask you if there are any promising treatments or research developments on the horizon that would be helpful to either prevent or treat cataracts, or maybe to prevent or treat AMD? What does the future hold for research on these?

DR. DUNAIEF: I think the future is very promising and exciting for new treatments. I will get to that in a moment, but I first want to mention one thing about the type of lens that is implanted for people with macular degeneration who are having cataract surgery.

There are a couple of special types of plastic lenses that can be implanted during cataract surgery. One of these is called a multifocal lens. This is a
lens that enables people to see at all distances without reading glasses. That may sound good and it could be for some people, but it really is not good for people with macular degeneration because the multifocal lens decreases the amount of light that we see coming from any distance, and that is bad for somebody with macular degeneration who already has a problem with light sensitivity. So I do not recommend the multifocal lens for somebody with macular degeneration.

Another type of lens option is the yellow-tinted lens. The yellow-tinted lens blocks blue light. There is some evidence that blue light can be toxic to the retina. This is primarily from studies in mice or in cells grown in culture, plastic dishes. A little bit of epidemiological evidence is suggesting that blue light may be damaging. These yellow-tinted lenses are an option for potentially protecting the retinas in people with macular degeneration. I do favor these yellow-tinted lenses, but it is not necessarily the standard of care for macular degeneration. There are differences of opinion about the yellow-tinted lenses to block blue light.

Okay, so now on to the research developments. For macular degeneration the thing I am most excited about at the moment is a drug called Lampalizumab, which is in a Phase Three trial for patients. It is currently being tested in patients with the advanced dry form of macular degeneration called geographic atrophy. What that drug does is it blocks a part of the immune system in the eye called the complement cascade. There is good evidence that the complement cascade plays a big role in macular degeneration.

Sometime this year, we are going to find out the results of this Phase Three trial and will see if complement blockade could be helpful for people with the geographic atrophy form of macular degeneration. If it is, I would expect that additional trials would look at whether complement blockade could be protective in other forms of macular degeneration, either earlier macular degeneration, where patients are not so symptomatic, or in wet macular degeneration.

MICHAEL BUCKLEY: We had a question from Charlene from Virginia, who wanted to know if there is any new progress about stem cells and AMD.
DR. DUNAIEF: Good question, Charlene. I am happy to say that there is. Stem cells can be derived either from human embryos or, in a really wonderful new discovery, they can be generated from a patient’s own skin cells. The skin cells can be reprogrammed to become more like an embryo in that the cells can have the potential to develop into any cell type, and then they can be coaxed to the right cocktail of growth factors to become retinal cells. Several human clinical trials have now shown that stem cells can be transplanted into the eye. In a small group of patients, this has appeared to be safe. More than that, the stem cells have persisted in the eye for as long as a year. That shows that the stem cells aren’t being, at least immediately, rejected by the recipient eye. There may be potential for them to persist for a number of years.

The stem cell approach I am most excited about involves a treatment to replace cells called retinal pigment epithelial cells. Those cells are support cells that help the retina. They can be grown on a plastic sheet and that plastic sheet can be rolled up and inserted under the retina, and then unrolled under the retina. When that is done, the cells can persist in that position for quite some time. It is likely that those cells would then support the function of the very important photoreceptor cells in the retina. There are some clinical trials now with stem cells, and I think there is good reason to be optimistic that some of them will be helpful.

MICHAEL BUCKLEY: I just want to turn to a couple of questions about clinical trials. Clinical trials is a phrase that everybody has heard, but people don’t always understand what they entail. I wanted to mention another free BrightFocus publication. This came out a few months ago. We put together something called Clinical Trials: Your Questions Answered. If you would like a copy, call BrightFocus at 1-800-437-2423. You can also download a copy on our website at www.BrightFocus.org.

So, Dr. Dunaief, you talked about a lot of that great progress and the clinical trials. Are there clinical trials that persons with cataracts can participate in?

DR. DUNAIEF: There is an approach now that is being tested to see if an antioxidant eye drop can slow the progression or halt the progression of
cataracts. This eye drop is called lipoic acid and, as I said, it is an antioxidant, and that blocks some of the free radical damage to the crystallin lens proteins. I am very interested to see whether that approach might be helpful for people who have early-stage cataracts in order to either slow or arrest the progression of the cataracts.

MICHAEL BUCKLEY: Yes, that will be interesting. On previous BrightFocus Chats, we’ve had reference to a miniature telescope that is implanted for AMD. I was wondering—we recently heard there will be a clinical trial on that. Is that something you can tell us a little bit about?

DR. DUNAIEF: Yes, these implantable miniature telescopes are interesting. Patients with AMD may lose function in part of the retina but still will actually often have function retained in other parts of the retina. Those healthy parts of the retina can be better used if an image is magnified, so traditionally patients with advanced AMD are given some form of magnification to help them read. This could be in the form of glasses that magnify things or special electronic devices that you can wear on your head to make things quite large, or devices that look like computers or television sets that make print larger.

There are also devices that you can wear on your glasses that will enable you to see something more distant at a higher magnification—little telescopes. An implantable miniature telescope is a telescope that is put inside the eye, and it replaces the natural lens of the eye. If we are talking about the process of cataract surgery involving the removal of the cloudy lens that you’re born with and replacing it with a clear plastic lens with the implantable miniature telescope instead of replacing it with one of our traditional clear plastic lenses, it is replaced with a little device that is actually a telescope, and that results in a magnified image being focused onto the retina.

Again, the advantage of that is that patients with macular degeneration can generally read better if the image is magnified. There are some pros and cons because that device limits the side vision—the visual field that can be seen by that eye. The other eye does not get a telescope, so the other eye can still be used for the side vision. So this is really only for certain patients who can tolerate using their side vision in one eye. There
is also some loss in depth perception because they need to have two eyes functioning for good depth perception. Patients who are being considered for an implantable miniature telescope (IMT) are first given simulation over a period of weeks so they would see what it will look like when they actually have the device implanted and see how they respond.

The clinical trials that you just mentioned, Michael, are to see if patients who have already had cataract surgery with the traditional plastic lens implanted could have the plastic lens removed and the IMT swapped into the eye. In the past, the IMT has only been used in people who have not had cataract surgery before and are just having their natural lens replaced. The reason this swap hasn’t been done before is because it’s safer to put the IMT into an eye that has never had cataract surgery before, because it’s more technically challenging to remove a plastic lens that has already been implanted into the eye than it is to remove the natural lens.

So surgeons who are highly skilled and trained in the lens removal and replacement will be doing the clinical trial and will see if it is safe enough to be able to approve that for many patients who have already had cataract surgery.

MICHAEL BUCKLEY: I appreciate you updating our listeners on that. Dr. Dunaief, I would like to conclude with your thoughts, as you have a lot of experience working with patients in the clinic and also on the cutting edge of research. I’m wondering if you have a big picture thought about what patients should know about their vision health or a common misnomer or myth that people come into your office about—do you have an overall final thought about these topics?

DR. DUNAIEF: Yes, thank you for asking that, Michael. A lot of patients come into my office terrified that they are going to become blind from macular degeneration. A lot of times I can reassure them that is not the case for several reasons. First of all, patients with the early stages of macular degeneration, which is detected by the ophthalmologist as the presence of little white dots in the retina called drusen, may never progress to late macular degeneration. If that is the case, then they’re likely to keep their good central vision their entire life. Most patients with drusen do not progress to late macular degeneration—it is only a subset
who progress to late macular degeneration. The risk of progressing can be determined by your ophthalmologist based on the number of drusen and the size of the drusen.

For patients who do progress to late macular degeneration, there are two forms of the disease; one is wet and one is geographic atrophy. With the wet form, patients usually lose their central vision. Fortunately, due to the advent of these anti-vascular endothelial growth factor (anti-VEGF) injections that came out about 10 years ago, many patients with wet macular degeneration maintain pretty good central vision for quite a few years.

For the people who develop geographic atrophy, that usually progresses as the area of atrophy enlarges, although slowly over the course of several years. For those patients, there is a lot of intensive research being done supported by the National Institutes of Health and foundations to try to develop new drugs to slow the growth of that atrophy—stop it or replace cells that have died, potentially with stem cells. There is a lot of help on the horizon that will be treatments to offer patients who have geographic atrophy.

MICHAEL BUCKLEY: I appreciate that, and this was a helpful way to end today’s conversation. To our listeners, we hope you found a lot of the information from Dr. Duniaief helpful. It is always a lot to keep track of, so we hope it helps you be better informed or ask better questions at your next doctor’s visit. You may wish to take a copy of this Chat’s transcript, found on our website, or by calling 1-800-437-2423.

Dr. Duniaief, I just want to thank you very much for your generosity. I think you gave our listeners a lot of information and also hope for the future. I appreciate your time today.

DR. DUNIAIEF: Absolutely, my pleasure Michael.

MICHAEL BUCKLEY: To our listeners, thank you very much for joining us today. On behalf on everyone at BrightFocus and Dr. Duniaief, I would like to thank you for being with us today.
Useful Resources and Key Terms

BrightFocus Foundation: 1-800-437-2423 or visit us at www.BrightFocus.org. Available resources include:

- Information on research funded by BrightFocus
- Amsler grid
- Macular Degeneration: Essential Facts
- Safety and the Older Driver
- The Top Five Questions to Ask Your Eye Doctor
- Clinical Trials: Your Questions Answered
- Healthy Living and Macular Degeneration: Tips to Protect Your Sight
- Cataracts and Age-Related Macular Degeneration

Answers to a few questions submitted by listeners on this Chat:

Mary from Arkansas. What is your opinion on the stem cell transplant instead of the plastic silicone lens? What is the best way to find out what transplant lens would be best for someone with near sight?

Experimental stem cell transplants are for the retina, not the lens. At the time of cataract surgery, all patients have a plastic lens implanted into the eye. The power of the lens implant is determined by measuring the length of the eye using ultrasound during one of the pre-op visits.

Arlene from New York. I have moderate dry AMD. I had cataract surgery, and each eye got the same lenses, but am seeing different magnifications from each eye. Is this from the cataract surgery or from the AMD?

This is probably from the cataract surgery. Even though each eye got the same lens, the length of each eye may be a bit different, and that would affect the magnification. Also, the precise position of the lens within each eye can affect the magnification.
Joe from Alabama. How often does AMD worsen after cataract surgery?

Cataract surgery does not make AMD worse. The AMD may worsen over time, but not because of cataract surgery.

Jerry from Maryland. If you have cataract surgery, should you get the same lens in both eyes? Or is it better to get two different lenses? The choice of lens implants has some trade-offs. Most people prefer to have both eyes end up a little near-sighted. Some people like "mono-vision," in which one eye is set for distance vision and the other for near. I would only recommend this to someone who has tried it with glasses or contact lenses and knows that she/he likes it. For someone with AMD, I would not recommend mono-vision, as you need both eyes working together when there is some visual impairment from AMD damage to the retina.

Len from New Jersey. I have only one working eye with AMD and cataract. Is it worth having surgery?

You need to be more conservative about cataract surgery to protect the one working eye. A small percentage of the time, cataract surgery has complications that could make the vision worse. Only have cataract surgery if you have a very cloudy cataract that is severely affecting your vision AND the ophthalmologist can determine that most of the visual impairment in that eye is due to cataract rather than AMD affecting the retina.

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