Introduction to Neuro-Ophthalmology

And ischemia just means lack of blood flow, so it's like a stroke in your optic nerve. Stroke in old people and inflammation in young people. And then sometimes something's pressing on the eye nerve either directly, which we call a compressive optic neuropathy, which means a tumor is actually pressing on your nerve, or you have swelling of your eye nerve because you have high pressure in your head.

And that can be from a tumor or it can be just from high pressure for no reason, which we call pseudo tumor. That condition is called papillodema. So papillodema is an optic nerve problem where the eye nerve is swollen from increased intracranial pressure and it can be from a tumor or something that acts like a tumor but isn't a tumor, pseudo tumor.

This is Doctor Talks. Real talk from real doctors on the issues that matter to you most. Welcome back. Today, I have the honor of hosting one of the leading neuroophthalmologists in the world, Dr.

Andrew Lee. Dr. Lee has dedicated his career to understanding and treating some of the most complex conditions affecting the visual system and the brain.

Dr. Lee is a prolific researcher, educator, and clinician with experience in neuroophthalmology, having authored hundreds of publications and trained countless specialists globally.

So we are so honored to have you here today on the iHealth Summit with us. So thank you for joining us, Dr. Lee. Thanks for having me. Absolutely. So just to start off, I always like to have our audience be introduced to the topic that we're going to be talking about.

What is neuroophthalmology? What is the subspecialty that we both practice? So, neuroophthalmology is the specialty that links two specialties, ophthalmology, which is the study of the eye, and neurology, which is study of the brain and the nerves, both the peripheral nerves and the central nervous system.

And so, neuroophthalmology is like a bridge between these two specialties. And how does one become a neuroophthalmologist? What type of training does it require?

So you can become a neuroophthalmologist either by being a neurologist first or being an ophthalmologist first, and both pathways lead after residency, which is after your medical school, to a fellowship training program in neuroophthalmology.

And some people do both neurology and ophthalmology residencies and then become neuroophthalmologists. Yeah, just for some fun facts to put out there, how many neuroophthalmologists are there approximately in the world, or let's say in the US?

In the US, we're probably between 450 and 500, depending on whether you include everybody or just the full timers. There are many people that kind of do a little bit of neuroophthalmology on the side or combine it with another subspecialty.

And I would say somewhere between four to 500. Okay. Yeah. So there aren't that many of us compared to some other types of specialties. What are some of the most common conditions as a neuroophthalmologist?

So the most common conditions are visual loss related to optic nerve problems. And the optic nerve is like a cable that connects the eyeball to the brain.

And then we've got brain problems that cause vision problems. And that's for seeing. And that's like the brain sees

one half of the vision. So the right side of your brain controls the left side of your vision and the left side of your body.

And the left side of the brain controls the right. So some people have half their vision loss to one side or another from a stroke or a tumor.

Optic Nerve Basics and Common Disorders

And then we've got double vision, where people see two of everything, or their eyelid is droopy, or their pupil, which is the black part of the eye, is bigger or smaller.

So those are the common things that we see. Droopy eyelid, ptosis, double vision, and loss of vision. And so basically what I'm hearing is that some of the vision problems that you see as a neurophthalmologist also involve the brain.

And can there be other symptoms as well, not just vision symptoms with some of these conditions? Yes. So when we have vision problems related to the brain, they often have other neurologic symptoms depending on which part of the brain it is, whether it's related to a systemic disorder or not.

So they might have headache in addition to what we would see them for double vision, loss of vision, weakness, numbness, tingling. spine symptoms or brain symptoms or constitutional symptoms, which is our fancy way of saying systemic symptoms like fever and rash and swollen lymph nodes that might represent a systemic condition that just happens to be showing up in the eye.

Do you experience migraine attacks that go beyond just a headache with symptoms like flashing lights, light sensitivity, dizziness, or trouble concentrating?

Well, there's a solution you may want to consider. Recommended by America's integrative neuro-ophthalmologist, Dr. Ronnie Banach, MD. Hi, I'm Dr. Rani Banik and I specialize in migraine relief.

Over the past 20 plus years, I have helped thousands of my patients reduce their headaches naturally with the power of nutrition and supplementation. Let me introduce you to COM, a unique blend of powerful botanicals and micronutrients designed to support your journey towards managing migraine.

COM contains five crucial science-backed ingredients, magnesium malate, riboflavin fever-fue, curcumin, and rosemary extract. Visit www.drronnybanek.com to order and get 10% off your first purchase.

Don't let migraine control your life. Take the first step towards being migraine-free with COM. Yeah, so it seems like it's a wide range of different types of conditions that can be seen in an ophthalmologist's office.

But I wanted to, for the rest of our time here today, Dr. Lee, I wanted to really focus on one of those categories, the first category that you mentioned, which is vision loss related to optic nerve disorders.

So for our audience, can you first describe what is the optic nerve? What's its purpose? What does it do? So the eyeballs like a camera and the whole front of the eyes like the lens of a camera.

Its whole job is to focus the beam of light onto the retina, which is like film used to be in old cameras. Now, of course, everything's digital, but the lens is the focusing part.

And then the film or the camera itself's memory is holding what the image that it is captured And then that signal is sent like a cable. So it's like the wire, wired device where the cable is the optic nerve carrying the picture, the image formed on the retina to the brain.

And it's the brain that processes that image. So the optic nerves, like the cable that connects the eyeball to the brain. Oh, that's absolutely fascinating.

I'm sure many people, they don't know that the eye is a direct extension of the brain embryologically, so it's really so critical to our vision to have a healthy optic nerve.

Now, of the many different types of optic nerve conditions that can develop in someone, what are some of the most common ones that you see in your practice, Dr.

Lee? So in young people, less than 40 say, those patients are much more likely to have inflammation of their optic nerve. And that inflammation is called itis.

So the suffix itis means inflammation. So if it's itis in your joints, we call it arthritis. If it's itis in your brain, we call it meningitis or encephalitis.

But if it's itis in your optic nerve, we call it optic neuritis, inflammation of the optic nerve. That's the most common acute optic nerve problem that we see and that's often associated with a systemic neurologic disorder called multiple sclerosis.

But sometimes it's from things that look like MS, but they're mimicking MS or they have MS-like illnesses. And for older patients, the most common cause of optic nerve damage is called ischemic optic neuropathy.

And ischemia just means lack of blood flow. So it's like a stroke in your optic nerve. broke in old people and inflammation in young people and then sometimes something's pressing on the eye nerve either directly which we call a compressive optic neuropathy which means the tumors actually pressing on your nerve or you have swelling of your eye nerve because you have high pressure in your head and that can be from a tumor or it can be just from high pressure for no reason which we call pseudo tumor that condition is called papil edema and So, papillodema is an optic nerve problem where the eye nerve is swollen from increase in cranial pressure and it can be from a tumor or something that acts like a tumor but isn't a tumor, pseudo tumor.

Yeah. So, just to recap again, there are different mechanisms that Dr. Lee described by which the optic nerve can be affected. It could be inflammation.

It could be lack of oxygen or blood flow. It could be compression or it could be high pressure in the brain causing optic nerve dysfunction. Let's go back to optic neuritis because I know that many people may have certain symptoms and they start Googling.

They go to Dr. Google and they look up, okay, vision loss, and they worry that they may have optic neuritis and MS.

Optic Neuritis: Symptoms, Testing, and Treatment

What are some of the most common symptoms of optic neuritis and then what are the exam findings that you would expect to see? So, optic neuritis is inflammation and so our inflammation words are pain and swelling and redness and those are the inflammation words.

So, patients with inflammation of the optic nerve optic neuritis often have pain with eye movement in addition to their main complaint which is loss of their center vision or their side vision which we call the visual field.

And so because so many things can cause loss of vision, even with pain, you really need to have an eye exam to look for the signs that it's an optic nerve problem.

That means having someone look in your eye and make sure nothing's in the front of the eye or in the back of the eye, like a retinal detachment. and if there's nothing in the eye causing it then we're going to swing the light that we use to check your pupil response and we can see the damage relative to the other eye of nerve damage from optic neuritis and that thing's called a relative afferent pupillary defect which is a big long name for relative to the other eye we can tell when the pupil isn't reacting as well compared to the other eye.

And so that finding, the pupil finding in the setting of acute vision loss with pain with eye movement is the distinctive characteristic finding of optic neuritis.

And may patients have other types of symptoms? For example, you mentioned that their peripheral vision may be affected. What about their color vision or perhaps their contrast?

Could that be affected as well with optic neuritis? Yes, because the optic nerve carries all of those fibers, the center vision, the side vision, the color vision, and the contrast.

When you damage the optic nerve, regardless of what the cause is, including optic neuritis, you'll have deficiencies in any or all of those visual parameters.

Visual acuity, which is the center vision, visual field, which is the side vision, color vision, and contrast. So let's say someone suspects they have optic neuritis, they have symptoms, they go to their ophthalmologist or neurophthalmologist, they get the diagnosis.

And what happens next? What are some tests or what else should the patient be doing? So patients with optic neuritis can just have isolated optic neuritis, which means it's not associated with anything.

It could be from infection or inflammation. And so usually we're gonna ask questions about exposure to infections. And then we're gonna do a scan called a magnetic resonance imaging MRI.

And that MRI scan is to look for inflammation. And on MRI, the inflammation is seen as enhancement, which is a fancy way of saying when you give dye, the dye leaks out into the optic nerve and we can see that leakage and that tells us it's active disease.

And in the brain, we're looking for the most common cause of optic neuritis, which is multiple sclerosis, which is a fancy way of saying a neurologic disorder of your brain and the optic nerve And it's from lack of the covering of the nerve damage to the covering.

And the covering is called myelin. The myelin is like insulation on your optic nerve and other nerves. And when you lose your myelin, the nerve doesn't function as well.

And the most common cause of multiple areas of damage to the myelin is called multiple sclerosis. Now you mentioned getting an MRI. What if someone were to get a CAT scan?

Is that enough? So a CAT scan can show some causes of optic nerve damage, like a big tumor, or it can show water on your brain, hydrocephalus, but it's not really that great for looking for the thing we're looking for in optic neuritis, which is enhancement of the optic nerve and multiple sclerosis lesions.

So MRI is a way better scan for optic neuritis. Thank you for that. I know a lot of patients when they first come in, they get this diagnosis of optic neuritis, they're very frightened, and then they look up multiple sclerosis, they get even more frightened.

But what do you tell your patients in terms of their ultimate outcome and treatment? And so the good part about optic neuritis is the vision's going to come back, regardless of whether we give steroids or no steroids, which is the treatment of inflammation.

The vast majority of optic neuritis, and especially for multiple sclerosis optic neuritis, giving steroids, and we give it by vein rather than by mouth in conventional doses, we get high doses intravenously, is just making your vision get better quicker.

So intravenous steroids is the treatment, but even if we don't get any intravenous steroids, people with optogoritis tend to just get better. It's only when it's these not MS causes of optogoritis that patients don't get better without the steroids.

And so that's why it's important to both be tested and treated for optic neuritis until we figure out are you the benign form or are you this more dangerous form, which is antibodies.

And antibodies are supposed to be fighting against bacteria and viruses, but when they attack you, we call that autoimmune disease. So those autoimmune antibodies are the things we're gonna be looking for after you're admitted to the hospital.

So the going to the hospital is two reasons. One is a diagnostic reason, to get the tests, to make sure it's not infection, to do the MRI. and a therapeutic reason, which is to get intravenous steroids.

Now you mentioned, let's say a patient does not want to get treated with steroids. In what time frame can they expect to get their vision back? Let's say this is what we call garden variety optic neuritis, or the most typical form.

How soon may they get their vision back? So if it's the garden variety, typical optic neuritis usually gets worse initially and then it peaks at around 14 days and then it starts to turn around.

Ischemic Optic Neuropathy and Risk Factors

So really we should be expecting improvement within weeks of the onset of a typical optic neuritis. Thank you. This has been such a fascinating discussion, Dr.

Lee. We are going to take a very short break and we'll hear from our sponsors and then be right back with the iHealth Summit. Do you experience migraine attacks that go beyond just a headache?

With symptoms like flashing lights, light sensitivity, dizziness, or trouble concentrating, there's a solution you may want to consider. Recommended by America's integrative neuro-ophthalmologist, Dr.

Rani Banak, MD. Hi, I'm Dr. Rani Banak, and I specialize in migraine relief. Over the past 20 plus years, I have helped thousands of my patients reduce their headaches naturally with the power of nutrition and supplementation.

Let me introduce you to COM, a unique blend of powerful botanicals and micronutrients designed to support your journey towards managing migraine. COM contains five crucial science-backed ingredients, magnesium malate, riboflavin, feverfew, curcumin, and rosemary extract.

Visit www.drronnybanek.com to order and get 10% off your first purchase. Don't let migraine control your life. Take the first step towards being migraine-free with COM.

Welcome back to the iHealth Summit. Today we're chatting with Dr. Andrew Lee, a leading neuro-ophthalmologist, and we're talking about various different types of optic nerve problems.

Next, Dr. Lee, I would love to get your thoughts on that other type of optic nerve condition that you mentioned earlier in which older patients may be affected where they may not have enough oxygen to the optic nerve.

Can you tell us a little bit more about that and why it may happen to someone? Yes, that lack of perfusion or lack of oxygen, we call that ischemia. And so when you have an optic nerve problem from ischemia, we call that condition ischemic optic neuropathy.

And ischemic optic neuropathy is a fancy way of saying you had a stroke. It's not like a stroke in your brain. It's a little vessel stroke, not a big vessel stroke.

So it is a stroke in the sense that it's ischemia, but it's not nearly as big or severe or life threatening as an intracranial in your brain kind of stroke.

There are two flavors of this ischemic ophthalmopathy. One is inflammation, which we call arteritis. And that arteritis we're worried about is in older patients who have inflammation of their artery, and that's a vasculitis, an

inflammation of the vessel wall.

And that causes the stroke because the inflammation is in the artery and the artery supplies the blood. And that is a uncommon form of ischemic ophthalmopathy, but it's the more dangerous form because that one requires intravenous steroids.

And then there's this other form, which is the not-arteritis form, which we call non-arteritic ischemic ophthalmography. And that's the majority of patients.

And that's small vessel ischemia and small vessel disease from the usual things that cause lack of blood flow in older patients, high blood pressure, high blood sugar, diabetes, high cholesterol, smoking, and hardening of the arteries, atherosclerosis.

So these are the common things that cause the common form of ischemic ophthalmopathy, non-arteritic anterior ischemic ophthalmopathy, that anterior is a fancy word for saying we can see the swelling.

So we can actually look in the eye and see the stroke. And so the doctor version of this condition is non-arteritic and arteritic anterior ischemic opneuropathy.

But we're just regular patients. We just say you have a little light small vessel stroke in your eye. Dr. Lee, you talked about a couple of risk factors for this non-arteritic form or what we also call it NA-ION for short sometimes.

What's another risk factor? The swelling, that's the anterior part. Anterior just means it's in the front. And in this case, it's in the front part of the eye nerve, right as it's connecting to the eyeball.

And if you have a small and crowded eye nerve, a little bit of swelling in a small space can make a big problem. So the predisposing risk factor for NAION, the stroke in the eye nerve, is if you have the small and crowded nerve, and that means a little bit of swelling can cause a big problem because the swelling doesn't have anywhere to go.

And we call this the disc at risk. The disc is the eye nerve itself, and the disc at risk is a small, cupless optic nerve that just doesn't have any room for swelling.

And so patients have this as a predisposing risk factor, and then there's a precipitating factor. And that precipitating factor is all those risk factors we just talked about, blood pressure, blood sugar, diabetes, cholesterol, et cetera.

Now, what if somebody goes in for their regular checkup and their vision is fine, they have no symptoms whatsoever, but they're told by their eye doctor that they have this disc at risk?

Should they be concerned? Is there anything they can do to prevent an optic nerve stroke? What are your thoughts? So a lot of people have this small disc and they're normal.

In fact, it's a normal lining. So even though it is a predisposing factor for ischemic opagravity, patients shouldn't be worried about it and there's nothing you can do about it.

However, you should be doing the things your doctor already told you to do regardless of the ischemic optic neuropathy disc at risk, which is eat a good diet, moderate amount of exercise, be a healthy person, eat right, lose weight, live a stress free life.

All the things we tell you to do as doctors, no matter what you have. And so if you have the disc at risk, you should just be following what your doctor already thinks you're doing.

Yeah, and I wanted to ask you about another risk factor that I've seen a lot in my patients, which is many of them with this type of optic nerve stroke have a history of snoring, and some of them actually have sleep apnea.

Is that something that you've seen as well in your patients with NAION? Yes, so the sleep apnea is a problem for

patients who might have ischemia of any type because you need the oxygen.

So the whole point of breathing is to push out the carbon dioxide and take in oxygen. And when you don't breathe, we call that apnea. And when that apnea, A means not and nea is P-N-E-A means breathe.

When you apnea, you're not breathing. And if you don't breathe, your oxygen goes down. And oxygen is part of the perfusion and the healthy oxygenation of tissues is required for their function.

And so that word we call hypoxia. So hypoxia is one of the H's of ischemic optic neuropathy. So now you've heard about hypertension. too high blood pressure, hypotension, hyperglycemia, which is the diabetes, hyperlipidemia, which is high cholesterol, and now we've got this extra one, hypoxia, which is lack of oxygen, and one of the causes of that is obstructive sleep apnea.

So once someone's been diagnosed with this type of optic nerve stroke, what is the management, like what is the standard of care with respect to going forward for these patients?

So even though we don't have a good and effective treatment for the stroke once it happens, our goal is trying to reduce the chance in the other eye. So that's where we're gonna contact the primary care doctor and in conjunction with the patient, work on getting all our Hs under control, our hypertension, our hypotension, our hyperglycemia, our hyperlipidemia, a sleep study if we're worried about the high.

We're going to check the blood count and make sure the hematocrit isn't too low.

Papilledema, IIH, and Optic Atrophy

And so we're going to try and address all of the treatable risk factors, which we call vasculopathic risk factors. We're trying to treat the risk factors to reduce the chance of it going in the other eye.

Overall, there's about a 15%, 1, 5, 15% chance that you'll have ischemic operability in the other eye. after having it in one eye. And so we'd like to try and get that number to single digits.

We cannot make it zero percent chance. There's some risk factors that are not treatable, like your age or your genetics, your mom and dad. We just can't change your gender and your race.

And so some of those things cannot be modified, but we can modify those ages. So we direct a lot of the encounter to educating the patient about what it is and then trying to prevent it from going in the other eye.

Yeah, absolutely. And I know that there have been many studies done trying to treat this type of optic nerve stroke and unfortunately, most of them really have not proven to be of any benefit.

Could you say a few words about some of the treatments that have been tried and maybe why they failed for this type of optic nerve stroke? Yeah, so ischemic, once the event occurs, the thing we're worried about is the tissue dies from lack of oxygen and that happens relatively quickly because central nervous system, including the optic nerve can't really survive without oxygen and blood flow for very long.

Part of it is a timing issue, but part of it is we really don't have good ways of reversing ischemia in the optic nerve. So the things that have been tried are blood thinners and steroids and agents that stimulate the red cells called erythropoietin.

All of these things have been tried, but they really haven't panned out, as you mentioned. Cutting on the eye nerve, called the sheeting, to let the pressure off the eye nerve was tried and it really didn't work and it actually harmed some patients.

And so we don't recommend it normally. So our focus is more aimed towards preventing fellow eye involvement and reducing that risk and not so much on treatments.

And the reason the treatment failed is basically ischemia is a stroke of your optic nerve and we really don't have good treatments for reversing stroke once it occurs.

Mm-hmm, yes. That's what I oftentimes tell my patients. Unfortunately, we can diagnose it, but there aren't that many options to reverse the damage that's been done.

The goal is to try to protect the other eye. That's really the goal. So in our last few minutes together, Dr. Lee, I wanted to touch a little bit upon the type of optic nerve issue that's caused by swelling or high fluid pressure in the brain.

You mentioned earlier papillodema and pseudotumorous rubri. Could you just say a few words about that condition? is so that word papillodema, edema is our word for swelling.

And the papilla is the optic nerve head. It's the part of the eye nerves that we can see when we look in your eye. And so papillodema is optic nerve swelling from increased intracranial pressure.

And usually that's from something inside your head that's causing the pressure because the skull is a closed box. If you have a brain tumor, you'll get high pressure.

If you have a brain bleed, you'll get high pressure. If you have a blunt cut, you'll have a high pressure. And so the main thing with papillodema is making sure that you don't have a brain tumor.

And that's the main reason for doing the scan. In the acute setting, we're going to be doing CAT scan, but really we're going to need an MRI. And sometimes it's from the vein that drains your brain is blocked.

And so we do an MRI. Venogram for that. A venogram is to look at that vein and make sure it's not got a blood clot in it. We're going to check the blood pressure because sometimes it's the artery that's too much blood and not the vein being blocked.

And so those are the common things that cause increased intracranial pressure. But sometimes there's no cause. And when there's no cause, we call that idiopathic.

So idiopathic is our word for we don't know what causes it. And the condition is called pseudotumor seroride because it acts like a tumor. Pseudo means false, but it's not a tumor.

And the preferred term is idiopathic intracranial hypertension, which is a fancy way of saying high pressure in your head for no reason. It's a disease that affects young overweight females.

We really don't know why. A lot of speculation about hormones and body habits and females versus male physiognomy, but we really don't know what causes it.

But it's way more common. IIH, idiopathic, is way more common in young obese females than true tumor. Even though we have to make sure it's not a tumor and make sure it's not a blood clot or a blood bleed, a lot of no-cause idiopathic.

Yeah, and I think you touched upon the fact that many of these women are overweight. Even though we still don't really know what causes IIH, we do think that weight is a significant risk factor.

And for patients who do have IIH who are overweight or perhaps obese, then weight loss is part of our treatment regimen, correct, Dr. Lee? Well, that's the best long-term treatment for the disorder is weight loss.

Absolutely. And I've seen patients where, in whom they achieve weight loss and they go into remission and their symptoms go away, their papillodema goes away, and they end up doing really well.

Dr. Lee, this has been such a fascinating session, your wealth of information. I just wanted to finish up really quickly

by asking you one more question about one more type of optic nerve issue, which is optic atrophy.

Now, I know it's a huge topic, but a lot of patients oftentimes ask me, I have this diagnosis optic atrophy. What does it mean? What can I do for it? What are your thoughts on that?

So all of the conditions that we've been discussing, optic neuritis, ischemic optic neuropathy, arteritic inflammation optic neuropathy, and papillodema, all damage the optic nerve.

And if the nerve damage is sufficiently severe, then we can see that damage in the back of the eye, and that's what we call optic atrophy. So we can see that the nerve was damaged.

Unfortunately, you can't tell what caused the damage by looking at a nerve that's atrophic. And so optic atrophy is a sign. It's not really a diagnosis.

And it is the final common pathway for any optic neuropathy, regardless of whether it's ischemic or inflammatory or infectious. or papillodema from increased intracranial pressure.

So when patients say they have optic atrophy, all you're saying is we know where your problem is, optic nerve, we just don't know why your problem is.

And so optic atrophy usually requires an investigation to find out the cause for the optic atrophy. The optic atrophy by itself is just a sign that something happened.

Yeah, understood. Now, if someone has optic atrophy, can you predict what their vision may be just looking at them? So we cannot predict based on the appearance of the eye nerve, what the center vision or side vision is.

That's why we always have to test patients. Cheens have some ways of measuring the thickness. So the severity of the optic atrophy is predicted, but it's not linear, which means it can look bad and still have good vision.

It can look relatively good and have bad vision in the center. So we would never just rely on looking at the optic nerve to judge someone's vision. We would actually measure their vision and measure their side vision with the visual field.

And the last question that patients always ask me is optic atrophy reversible? So optic atrophy is not currently reversible, but it's the same for all central nervous system.

And central just means your brain and optic nerve is the extension of your brain. So the brain and spinal cord, just like patients who have injuries to their spinal cord or brain, it doesn't really regenerate very well.

And we don't really have good treatments for optic atrophy, but one day we will have treatments. We'll be able to replace the optic nerve with a transplant.

And one day we'll be able to put stem cells in there and grow a new optic It's just not ready yet, but it's coming. That little bit of hope is really, I'm sure, going to inspire a lot of patients because oftentimes patients get dejected.

They have a diagnosis, their vision's not ideal, and they feel like there's nothing they can do. So it's wonderful that there are these treatments in the pipeline.

And I always tell my patients, maybe not today, but maybe five, 10, 20 years down the road, we will have something to offer you along those lines of stem cells or retinal cell transplants, et cetera.

Dr. Lee, again, this has been a fascinating, wonderful discussion. Thank you for all your thoughts. Is there any one last thought you would like or piece of advice you would like to leave our listeners with today?

Yes, so if your doctor tells you have an optic nerve problem and they can't figure it out, that is what neuro-

ophthalmologists do every day. So all your listeners need to know, when do I need a neuro-ophthalmologist?

You need a neuro-ophthalmologist when it's a problem between the nerve, the neuro, and the eye ophthalmology. And if your eye doctor or your neurologist can't figure it out, that's the time to call your local friendly neuro-ophthalmologist.

Yes, thank you. Yes, and I highly encourage people, if they don't have a neuropathologist that they have ready access to, you can go to the website of our society, the North American Neuropathology Society, and you can find a doctor through that website.

We will post the link. Again, Dr. Lee, thank you so much, and I wish you a wonderful day, and I wish our audience a wonderful day as well. Thank you. Thanks for having me.

Real Talks from real doctors on the issues that matter to you most.