English Transcript

Interview with Dr. Angeline Nguyen

Speaker 1:
Grand Rounds, an open podcast.

Dr. Eyal Ben-Isaac:
Hello and welcome to the perspectives on Pediatrics podcast. I'm your host, Dr. Eyal Ben-Isaac, recording from Children's Hospital Los Angeles. I had the pleasure of talking to Dr. Angeline Nguyen, who is an assistant professor of ophthalmology and an attending physician at Children's Hospital Los Angeles, and the director for medical student education in pediatric ophthalmology. I got to chat with Dr. Nguyen on the topic of the red eye, a common chief complaint we see in the office. Dr. Nguyen did a great job of describing the various etiologies of red eye, teaching us when we need to worry, reviewing some specific physical exam findings, as well as discussing the management options for this problem. This was a very educational session for all of us who care for infants and children. Here's my conversation with Dr. Nguyen.

Dr. Eyal Ben-Isaac:
Hello everyone. Today, we are here with Dr. Angeline Nguyen from Children's Hospital Los Angeles. Welcome Angeline.

Dr. Angeline Nguyen:
Hi, glad to be here.

Dr. Eyal Ben-Isaac:
Thank you so much for joining us and teaching us about the red eye. Something we often see in the office setting, urgent care clinic, or the emergency room. I thought maybe we could start with a non-specific case that many of us see in our office and go through some of the important historical and exam findings, considerations at various ages and important management concepts. Maybe we can also even review the specific considerations in neonates as well.

Dr. Eyal Ben-Isaac:
So let's start with our case, the parents of a three-year-old female bring in their daughter stating that she has had a red eye for one to two days. It is only red on the right side. The redness specifically involves the white part of the eye. There has been no fever, no cough, no runny nose and no discharge. So before we talk about the important historical or physical exam findings to explore, what are some broad categories we should consider when we approach a child with a red eye?

Dr. Angeline Nguyen:
So, first of all, I can sympathize with anyone who finds it daunting to see a child present with a red eye in their office. Even ophthalmologists feel uneasy about these cases because the differential diagnosis can be very broad and the history and exam can often be limited. Thankfully, many of the common causes of red eye are benign, but there are some serious conditions that should be recognized and referred to a specialist, which we will talk about in more detail later.

Dr. Angeline Nguyen:
One way to approach the red eye is to compartmentalize it anatomically. Sometimes the white parts of the eyes are secondarily red from conditions that are primarily affecting the surrounding structures of the eye, not the eye itself. Examples of the surrounding structures include the nasolacrimal system, such as in dacryocystitis or the tissues within the orbit, such as in orbital cellulitis, or if it primarily involves a preseptal tissue or the lids, this is called preseptal cellulitis.

Dr. Angeline Nguyen:
On the other hand, if the eye itself is primarily involved then the white part of the eye, which includes the conjunctiva or the underlying episclera or sclera can be primarily involved, or the white part of the eye may be secondarily red due to issues involving the cornea or the deeper intraocular tissues, such as in cases of uveitis.

Dr. Angeline Nguyen:
Aside from the anatomical classification, we should also consider the differential diagnosis based on pathogenesis. So major categories to consider, especially in

children are trauma, which can include a foreign body or chemical injury. Secondly, we consider infectious causes of inflammation as well, which are typically viral or bacterial. And then there are non-infectious causes of inflammation such as blepharitis, or allergic conjunctivitis.

Dr. Angeline Nguyen:
Finally, we also have to remember that the eye can be inflamed in the setting of a systemic disease. The most common example of this is anterior uveitis in the case of juvenile idiopathic arthritis. So it's important for pediatricians to roughly have a sense of what the diagnosis is in order to know when to refer. In general, most viral and bacterial conjunctivitis or ocular allergies, maybe some mild corneal abrasions should be appropriate for a generalist to manage. Other conditions that could cause permanent vision loss, such as more severe trauma or infections that involve the cornea or uveitis should be referred.

Dr. Eyal Ben-Isaac:
Angeline, can we spend a few minutes talking about the difference between preseptal cellulitis and orbital cellulitis, how to distinguish the two and why the importance?

Dr. Angeline Nguyen:
Definitely. I can understand the stress in trying to determine whether it's something that's orbital, which is postseptal, because that does require more intense management. So preseptal cellulitis involves the tissues that are anterior to the septum, which is a very thin membrane that is what we consider something that separates infections going from the anterior part of the eyelid and the periorbita to getting into the orbit and potentially going further back into the brain. So for preseptal cellulitis, we often see that the eyelids are swollen and inflamed and there's erythema. The eyelid can be swollen shut. And these are typically due to infections that are a lot more anterior. It can also be instigated by an insect bite or trauma. These can often be treated with oral antibiotics that don't necessarily have to be IV.

Dr. Angeline Nguyen:

In cases where we think that there could be orbital involvement, then we have to consider IV antibiotics. And the way to distinguish preseptal from orbital cellulitis is through the physical exam and through history as well. Typically, orbital cellulitis is spread to by the sinuses. So a child with a history of sinusitis is someone who I'd be suspicious for orbital cellulitis. Some exam findings are more typical of orbital cellulitis would be decreased vision and afferent pupillary defect, proptosis, or extra ocular movement limitations that are often painful. So on your exam, it's really important to ask them to move their eyes in all the different directions to see if there's any limitation. Any limitation is considered to be what we call an orbital sign. And therefore it's highly suspicious for orbital cellulitis. These patients should be referred to an ophthalmologist. They often require additional imaging and sometimes even surgical drainage if there is an abscess present.

Dr. Eyal Ben-Isaac:
Thank you for differentiating it into those categories. It definitely helps. Are there important historical questions we should be asking to help us decide the reason for the red eye?

Dr. Angeline Nguyen:
So when a child presents, I think you should always ask your usual line of questions about their past medical history, their perinatal history. When it comes to the eyes, we should always ask about known ocular conditions. Another important question is about contact lens wear, since these can be associated with bacterial corneal infections. And of course a review of systems is important to rule out any underlying systemic disorders, such as asking about joint pain in the setting of juvenile idiopathic arthritis.

Dr. Angeline Nguyen:
Other important questions to ask about the present illness include the onset, the duration, whether it's unilateral or bilateral. For example, if one eye was initially red followed by the second eye, after several days, this usually points to viral conjunctivitis. Other important historical features that are helpful for diagnosing viral conjunctivitis are if a child had recently had an upper respiratory illness or has sick contacts. Other historical findings are, if they complain about crusting around

the eyes, especially in the morning or tearing throughout the day. The presence and character of discharge can also be helpful for determining whether there's a bacterial infection, which typically is a little bit more purulent than a viral infection. Other questions to ask to determine the severity of the condition are, of course, if there've been any vision changes. This might be hard to elucidate in a younger child.

Dr. Angeline Nguyen:
Finally, the most important thing to remember is asking whether there's any history of trauma whatsoever. Children are not always forthcoming about a history of trauma, because they might think that they might get in trouble for whatever they were doing. But if the onset is sudden when it occurred while the child was playing outside or in another sort of suspicious condition, then it's something to always keep in the back of your mind.

Dr. Eyal Ben-Isaac:
What are some important physical exam findings we should look for to help us decide how to manage the condition? And are there any specific indications for tests we should do in the office such as vision screening, fluorescein staining or anything like that?

Dr. Angeline Nguyen:
Yeah, so it is important to check vision if possible. It can be hard in a pre-verbal child, but you can at least try to determine if their visual behavior such as fixing and following on a small object is equal in both eyes. If the vision seems decreased in either eye, then this is a reason to refer. Other tools that a pediatrician might have in their office are a pen light. So that can be used to assess the pupils for reaction to light. It can also be used to look at the cornea for clarity. If the pupils are not round or reactive, or if the cornea has areas of opacification, then these are reasons to refer.

Dr. Angeline Nguyen:
A few pediatricians also have what's called a wood's lamp in their office, which is a light with a blue filter that can be used to highlight fluorescein stain. So you can

examine for corneal epithelial defects, such as abrasions by instilling topical anesthetic and fluorescein stain into the eye. And looking at the surface with the blue light. Corneal abrasions can light up readily with fluorescein and certain infections involving the cornea can be stained with as well, but these will be associated with white infiltrates. So if you're seeing white areas of infiltration, these are reasons to refer.

Dr. Angeline Nguyen:
Finally, you should also examine the conjunctiva really well, including underneath the lids, because oftentimes if there's a foreign body or if there's signs of trauma, that can actually be hidden underneath the lid. So it's important to move the lids in order to look into the fornices. Finally, if there's a significant amount of discharge, then samples should be taken for gram stain and culture, which can help guide management.

Dr. Angeline Nguyen:
Can you describe what a ciliary flush means and the significance of this finding on examination?

Dr. Angeline Nguyen:
Yeah. So as you're suggesting, looking at the pattern of redness on the white part of the eye can be helpful. So if you're seeing a distinct redness around the limbus, which is where the cornea meets the white part of the eye, this can be indicative of uveitis which is intraocular inflammation. If you're seeing the ciliary flush, then I recommend that you refer this child to an ophthalmologist because intraocular inflammation or uveitis can cause damage to structures inside of the eye, which can be sight threatening.

Dr. Angeline Nguyen:
You alluded to this earlier, are there any specific things that we should try to look for to figure out if the redness is due to a virus, a bacteria, or even allergies?

Dr. Angeline Nguyen:

Sure. So with viral conjunctivitis, the history is often the most helpful. The parents will report that the child had an upper respiratory tract infection leading up to the red eyes and that there's crusting in the morning and tearing throughout the day. And usually one eye is affected first followed by the other. On the exam, the conjunctiva can look kind of boggy and swollen and sometimes even look really red in the cases of hemorrhagic viral conjunctivitis. When it comes to bacterial conjunctivitis, the child might have also a preceding bacterial upper respiratory infection, but usually the symptoms of the eyes are more often unilateral and there's more purulent discharge as opposed to the tearing seen in viral conjunctivitis.

Dr. Angeline Nguyen:
Finally, you asked allergic conjunctivitis and usually this is a more indolent condition. What is specific to allergic conjunctivitis is that the child will complain about itching. And historically these kids might have the atopic triad, meaning they have asthma, eczema, and allergic rhinitis as well. These are the usual suspects. There is sometimes minimal tearing and scant discharge with allergic conjunctivitis, but that's not quite as prominent as in the other conditions.

Dr. Eyal Ben-Isaac:
Thank you. That was perfect because it is often really a challenge to sometimes decide, is this a virus or is this a bacteria and what should we do. So thank you for those tidbits. Can we review the features of a dangerous red eye and what we should not miss?

Dr. Angeline Nguyen:
Yeah. One of the most devastating things I've seen missed is trauma. The findings are not always obvious, which is why it's really critical to do those exam findings that I had mentioned previously, checking the vision, checking pupils and looking underneath the lids. A hidden area of trauma could lead the pupil to look irregular. So that's why I mentioned to look at the pupils. I often tell my trainees to look for a teardrop shaped pupil because this means that the iris could be moving towards the direction of a defect in the eye globe.

Dr. Angeline Nguyen:
Additionally, if you're able to stain the cornea with the fluorescein, as I mentioned, make sure that there isn't involved also a tiny stream of fluid leaking from an area of epithelial defect that you're suspicious, as an abrasion because this stream could suggest that there's a defect that's actually full thickness through the cornea. So these cases of full thickness trauma in the eye globe are an emergency. The patient should be given a dose of systemic broad spectrum antibiotics, if possible, and have a hard shield placed over their eye and referred emergently to an ophthalmologist for surgery within the same day. Finally, you mentioned the ciliary flush earlier, which is that intensely red flush around the limbus. This could represent uveitis, which is another reason to refer to an ophthalmologist.

Dr. Eyal Ben-Isaac:
I know you already covered things related to trauma, but we as pediatricians really don't want to miss anything related to, for example, an open globe. Is there any clues on exam that you would caution us to look for so that we can make the right diagnosis?

Dr. Angeline Nguyen:
Yeah. So I completely understand the fear of missing an open globe because if a child has an open globe that goes missed for a while, it can lead to endophthalmitis, which is where all of the tissues of the eye are infected because there is now a source for bacteria to enter the eye. So certainly something to be fearful of. And it's something that we worry about specifically as well.

Dr. Angeline Nguyen:
So the things I mentioned previously just to review are looking at the pupil, making sure that that's round, if it's peaked or has a teardrop shape to it then that is concerning for maybe a defect within the eye globe that's full thickness. The other thing to look for is if you know, there is a clear area of trauma to the cornea because you stained the eye and you see that there's an abrasion that is staining with the fluorescein to make sure to take a close look at that to see there's no leakage of fluid from inside the eye going out.

Dr. Angeline Nguyen:
Some other typical signs of open globe if it is on the more severe side, is that the global will actually no longer appear to be well formed. And the anterior chamber, which is normally vaulted and the eye globe looks like a full ball will actually appear a little bit flattened. So you'll see that the iris is coming closer to where the cornea is because the anterior chamber no longer has the same amount of volume in it. Of course the eye would be red and as I mentioned previously, always check for vision. If there's a decrease in any of these other signs that I mentioned, you should have a really high index of suspicion for an open globe and refer these to an ophthalmologist right away for urgent surgical intervention.

Dr. Eyal Ben-Isaac:
Those are wonderful clues to look for on exam. Thank you so much. So we went through important historical questions we should ask. We looked at important physical exam findings. Now what do we do with that red eye? How do we decide when to treat and what are some of our treatment options?

Dr. Angeline Nguyen:
So, as I mentioned previously the conditions that can be readily treated by the generalists are things like viral or bacterial conjunctivitis. So when it comes to viral conjunctivitis, this is really just supportive care. The symptoms usually decrease within the first week, but if they persist, then that's just a reason to refer to the ophthalmologist. Some things to do for supportive care are cool compresses and artificial tears. Sometimes as you alluded to earlier, some pediatricians are unsure if there could be a bacterial component. So I think it is all right to try to use antibiotic drops as well if you're not entirely sure if it could be viral or bacterial. And finally I mentioned earlier that allergic conjunctivitis doesn't look quite as severe as viral or bacterial conjunctivitis, and these often are not truly associated with vision threatening disease. So those can often be managed also supportively in the generalist office with eye drops that have some anti-histamine or anti mast cell stabilizing agent. But if that doesn't improve within several weeks or months, and that can also be referred to the pediatric ophthalmologist.

Dr. Eyal Ben-Isaac:

Can we spend a few moments talking about blepharitis and how we might diagnose it by history, exam, and then what do we do with it once we've diagnosed it?

Dr. Angeline Nguyen:
Yeah, blepharitis can be very challenging in that the symptoms are quite non-specific and also the treatment can be very difficult and prolonged. So blepharitis is a common cause of bilateral and chronic eye irritation. It can present of course with red eyes and the common symptoms are chronic burning and itching. Usually this is due to overgrowth of bacterial flora at the eyelid margins. And what findings distinguish blepharitis from maybe your other types of red eye are that you will see small flakes and crusting at the eyelash and eyelid junction. There might also be chronic skin changes there as well, such as eyelid thickening, redness, and scaling. Some children that are predisposed to having blepharitis also are those that have rosacea or eczema. So I have a higher index of suspicion in those children.

Dr. Angeline Nguyen:
And as I mentioned, the treatment can be very prolonged because this is such a chronic kind of indolent inflammation. Some things I like to try as first line are things that can easily be done at home, such as cleaning the eyelid margins, either with a tear free shampoo or a type of pre-medicated wipe that can be bought in the pharmacy. And so this can be done once or twice a day to ensure that you are reducing the burden of that bacterial flora at the eyelid margin. And there may be other organisms that might be involved in blepharitis as well. We're learning more and more that Demodex is highly involved. And so really cleaning those eyelid margins to get rid of those antigens can be very helpful.

Dr. Angeline Nguyen:
Additionally, using warm compresses about 10 minutes twice a day can be something that can help. Also with clearing out the Meibomian glands, which are those oil glands in the eyelid. Helping those flow can also prevent things like stye formation. So styes are very commonly seen in blepharitis and are very annoying to try to treat, but with using the warm compresses and the lid hygiene, as I mentioned, these are ways to prevent styes.

Dr. Angeline Nguyen:
Additionally, you might try an erythromycin or some other type of antibiotic ophthalmic ointment at nighttime to try to decrease the burden of the bacterial flora that are there at the eyelid margin. So I think that the generalist can try to treat these and manage them in their office. And it might take weeks, sometimes even on the order of months to treat this. I do want to caution though that if it doesn't get better within a few months, I would refer these patients to a specialist because having it this severe, if it's severe blepharitis, for a while, can cause damage to the cornea because the inflammation can spill over from the eyelid margin to the cornea. So you'll see that the cornea, which is supposed to be a clear tissue, becomes white and has some vascularization to it. And these are often changes that are irreversible and can lead to vision loss.

Dr. Angeline Nguyen:
So if you're having real trouble treating a blepharitis and the child is still having chronic eye irritation that's not improving at all, please refer those to an ophthalmologist. And so the ophthalmologist will probably treat with steroid eye drops as well as antibiotic eyedrops to try to clear these. And there's also other mechanical techniques that the ophthalmologist can do to open up the oil glands as well.

Dr. Eyal Ben-Isaac:
Fascinating. And thank you so much for reviewing blepharitis. I remember very well being taught by an ophthalmologist to not start steroid drops myself as a general pediatrician without first sending them to the ophthalmologist, just because of the potential dangers of using steroid drops in some situations. Let's spend a little time talking about the red eye in a neonate and what we should think about at that age.

Dr. Angeline Nguyen:
Sure. Yeah. Red eye during the first month of life can be due to conjunctivitis like we had mentioned. And that can be due to actually chemical or infectious causes. As far as the chemical conjunctivitis, the onset is usually within the first 24 hours of birth. And it's a reaction to the topical bactericidal that's placed in the eyes to prevent infection. We don't see that so much in the United States anymore because

we're no longer using silver nitrate or povidone iodine, but these can still be used in other parts of the world. So that is something to keep in mind that it's something related to a chemical irritation. If the conjunctivitis occurs after 24 hours from birth, then it is more suspicious for an infection. And this generally warrants a referral to an ophthalmologist because the child may require systemic treatment and close monitoring for corneal involvement. A gram stain and culture should be completed. And a thorough review of the maternal history is important in these cases.

Dr. Angeline Nguyen:
Some examples of the conditions that could be involving the conjunctiva at this early age are gonorrhea associated conjunctivitis or chlamydia associated conjunctivitis. And it's useful to remember that these can go hand-in-hand. Gonorrhea associated conjunctivitis is very purulent and aggressive and it requires intramuscular ceftriaxone for treatment. And chlamydia associated conjunctivitis can be associated with pneumonitis. So treatment for this also requires systemic erythromycin. A child can be suspected also of having herpes simplex related rash and redness of the eye related to that. And if that is suspected, then systemic treatment with Acyclovir is required as well due to the risk of systemic and intracranial spread.

Dr. Angeline Nguyen:
Finally, neonates presenting with infection can also involve the nasolacrimal duct systems at which I mentioned before. This could be due to nasolacrimal duct obstruction or a dacryocystocele which then leads to dacryocystitis. In these cases because the child is still so young and is at risk of sepsis, they require systemic antibiotics as well. And oftentimes they require a procedure done to open the cyst in the nasolacrimal duct.

Dr. Eyal Ben-Isaac:
Thank you again. This was incredibly informative and very, very educational. Are there specific takeaway points that you would love our audience to keep in mind?

Dr. Angeline Nguyen:

So there are a few takeaways that I think are important and hopefully helpful. The first, as I mentioned before is always consider trauma and have a very low suspicion for referring those cases immediately. Even if you think there could just be as simple abrasion, if there's anything more severe, that may be something that requires surgery. If there's no vision loss and the condition that you're seeing appears to be related to the conjunctiva or the eyelids, then it is perfectly fine for the pediatrician to treat this initially. But have a low threshold for referring those cases. If the symptoms are not improving within the first week, if it's infectious or if it's blepharitis or allergic, like I mentioned, and not improving within several weeks to months, and that is something worthwhile to refer as well. Finally, if there's any condition you're seeing, where there is decreased vision or severe photophobia or discomfort, then please refer those to a specialist because that can signify some significant underlying disease.

Dr. Eyal Ben-Isaac:
Thank you so much, Angeline. And thank you for educating me and thank you for educating our audience today.

Dr. Eyal Ben-Isaac:
I hope you enjoyed my conversation with Dr. Nguyen as much as I did. If you'd like to hear more from our pediatric experts, subscribe wherever you listen to podcasts and keep in touch with us by subscribing to learnwithopen.org and check out the links and resources in our show notes. If you liked what you heard, please rate us and leave a review. This podcast is produced by the Online Pediatric Educational Network and Mindy Lee. This episode was mixed and edited by Daniel Lev. Our music was created by Daniel Lev and Juan Espinosa.