Uveitis and Glaucoma: The Seven Reasons Why IOP Can Increase in Uveitis (and What to do About It)

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Course Description: This course will cover the causes and treatments of uveitic glaucoma, including clogged, inflamed, and damaged trabecular meshwork, synechiae, and steroid response.

Course Objectives: This course will teach the seven reasons why IOP can increase in uveitis, and how it can be treated:
1. Clogged Trabecular Meshwork (TM)
2. Inflamed TM
3. Damaged TM from chronic uveitis
4. Peripheral Anterior Synechiae (PAS)
5. Posterior Synechiae (PS)
6. Steroid Response
7. The eye is getting better

Hello and welcome to Pacific Online Continuing Education. This is Anthony DeWilde and I am an optometrist at the Kansas City VA Medical Center. What I’m going to talk about today is Uveitic Glaucoma. I want to start off this lecture by telling you I have no financial disclosures, and I am not going to talk about anything during this lecture that is a specific medicine or a specific manufacturer of a medication.

I really like this topic, Uveitic Glaucoma, because it’s a very difficult subject to master and it’s often a very difficult disease to manage. However, if we back up and really understand the pathophysiology of how uveitis increases the intraocular pressure (IOP), then we can understand how to best look for the causes and how to best treat this disease. You may be sitting there thinking, “Well, Anthony, pathophysiology is really boring. That was 2nd year stuff.” Well, it’s important to get back to the basics to understand what is going on and to clear up any misconceptions. This will help guide our therapy.

Now, before I start, I want to define glaucoma in this case. Traditionally, the way we define glaucoma is: increased IOP or normal pressure leading to optic neuropathy and visual field loss in a characteristically excavated fashion. What I don’t mean here is that the glaucoma is necessarily causing optic neuropathy. When we talk about uveitic glaucoma and neovascular glaucoma, we are talking about secondary glaucomas that increase the IOP and may or may not actually cause the optic neuropathy. Thus, I apologize for the nomenclature, but I think I want to stick with convention so I don’t confuse matters too much.

Let me start off with a quote here. I really like this quote because I think it really portrays what I’m trying to get across here. What it’s saying is that an expert is someone who knows how to make the right judgments by knowing what to

“An expert is someone who has succeeded in making decisions and judgments simpler through knowing what to pay attention to and what to ignore.”

~ Edward De Bono
pay attention to, and what to ignore. By understanding the pathophysiology of uveitic glaucoma, we are better able to make judgments on what to pay attention to and what to ignore.

For instance, let’s take a step aside and look at diabetic retinopathy. If we are just doing an exam on a diabetic and are not thinking about what could threaten the vision in that patient, we may be nonchalant in what we are looking for. But if we are looking specifically for the causes of vision loss, such as neovascularization, or clinically significant macular edema (CSME), then we are going to be in tune to what we need to find. Thus, specifically for that diabetic patient, we are going to be looking at that macula as if they have retinal thickening, and almost making the macula talk us out of deciding they have it. The same thing applies to uveitis and glaucoma. If we see the pressure increase, we should be paying very close attention to what matters, and ignoring the things that don’t. Hopefully by the end of this pdf you will be more of an expert on uveitis and glaucoma, and specifically how we guide our examination and treatment. Understanding the pathophysiology will help you understand how to make these correct observations.

**The Basics**

Let’s start from the beginning. Let’s just talk about inflammation in general. We are all taught about the Latin terminology of rubor (redness), calor (heat), dolor (pain), and tumor (swelling). The only one missing on Fig 1 is calor. I think if we measured the temperature of a patient’s eye with uveitis, I think that we would find that they had increased temperature of the eye. However, there is no way to measure that, clinically, and clinically it is not very important. What is important is the swelling, pain, and the redness. Most important are the white blood cells (WBCs) migrating to try to fix this problem that maybe doesn’t need as much fixing as the body is producing.

The signs and symptoms of uveitis and inflammation in the eye are miosis, ciliary flush, cells, flare, most often decreased IOP, pain and photophobia. The most important of these is actually cells. There are a couple of reasons why: first off, cells are what actually tell us a patient actively has inflammation and help us guide our treatment, and taper the treatment as needed. When the patient comes back on day 5, we judge the number of cells relative to day 1. Then on day 10, we judge the number relative to day 5 and day 1. Thus, cells are very important to us to guide our treatment.

The other reason cells are important is all of these other signs and symptoms can manifest in other diseases: pain is a very common symptom, as is photophobia. Miosis can happen in other conditions, especially as we age. Ciliary flush is common in many other red eyes. Flare is something that we could see in a patient who has chronic diabetes and may or may not help us distinguish someone who has
active inflammation. In fact, flare can linger for months or years after inflammation has quieted. Decreased IOP can be normal or abnormal. We never really worry about decreased IOP from uveitis – it’s not like we get hypotony from decreased IOP in uveitis. It just doesn’t get that low. The other thing I would encourage you to do is to separate diagnosing cells from flare. So often I hear our students and residents at the VA refer to this as ‘cells and flare,’ as if it’s one entity, but they are two separate entities: cells are the active inflammation, the WBCs in the anterior chamber, while flare is proteinaceous material that can be left over after the inflammation has cleared. Sometimes we get continuous flare if there has been a breakdown in the blood-aqueous barrier, so flare does not tell us a whole lot and we should differentiate the two.

Our examination of a patient with uveitic glaucoma is going to involve a thorough slit lamp examination, looking for key findings – thinks that can cause increased IOP. Of course, we are going to measure the IOP and, most importantly, we are going to do gonioscopy. I think gonioscopy is a very key thing here because without it we cannot tell for sure why the pressure is increased. I feel that in general in optometry, this is an underutilized tool, specifically in glaucoma and uveitic glaucoma.

As I mentioned earlier, we don’t have to worry about IOP increases in uveitis typically because the IOP is usually lowered. If it does increase, what do we do? As I just mentioned, we need to do a thorough examination, and I think we have to have a thorough understanding of pathophysiology to help guide our treatment. By understanding the pathophysiology we can guide our exam, and guide our treatment.

Causes of Increased IOP

There are seven ways the IOP can increase from uveitis, and they are listed on the table to the right. The trabecular meshwork (TM) can get clogged. There can be posterior synechiae, peripheral anterior synechiae, steroid response, the eye is simply getting better, inflamed TM or chronic damage to the TM.

I am leaving off one very rare complication of uveitis. Patients that have very bad, chronic or recurrent uveitis, can get neovascularization which can lead to rubeotic glaucoma. I think if you have practiced for many years, you would maybe see one of these. I just don’t feel they are very common unless you work with a lot of uveitis.

Let’s start with explanation number one: the trabecular meshwork is simply clogged. I think this is a very common reason for increased IOP. This happens in very red, angry eyes that have very bad uveitis. You can imagine someone who gets uveitis so badly that the get a hypopyon, just how badly those cells are accumulating in the trabecular meshwork. I think the TM has a tough time phagocytizing those WBCs, and therefore the cells clog up the TM in that way.
The clogging can also be due to flare, and flare is responsible for thickening the aqueous and making it harder for the aqueous to flow through the TM. The way I think of this is to imagine cells floating in a very normal, runny aqueous. You can see this often as you are looking at cells, they will just be moving about very quickly in a fluid manner. If the aqueous is thick, then they move around very slowly. The analogy I like to think of is comparing cells in a snow globe to cells in your grandma’s Jell-O pudding. In the first example, the snow globe, you shake it up and it’s very fluid – everything moves very rapidly. Start shaking up some Jell-O, things won’t be moving as quickly. They will be very slow and bogged-down.

I’ve had this happen very recently where I had a patient with such a bad uveitis, and so much flare, that after treating him the first couple days with very aggressive therapy, he came back with a fibrin clot. In fact, his aqueous was so thick it had formed a fibrin clot. I looked at this patient and thought, “Oh, my goodness, that’s incredibly thick aqueous.” What I ended up doing was sending him off to the ophthalmologist because my aggressive therapy was not cutting it. By aggressive therapy, I mean PredForte every hour. This patient saw the ophthalmologist that day, and what they were going to do was a sub-Tenon’s Kenalog injection. They were on the phone with the uveitis specialist, needle in hand, and the specialist said, “Let’s hold off on that and try something different first.” I had never heard of this chosen therapy before, but you may have: using dexamethasone ointment.

Dexamethasone ointment is more potent than PredForte for a couple of reasons. First off, it’s an ointment form, so therefore it stays on the eye longer and penetrates deeper. The second reason is that dexamethasone in and of itself is about 4 times stronger than PredForte. Making that combination, you could imagine why it would make such a difference. You may not be aware of this, but you cannot get dexamethasone ointment by itself – that is no longer made. You can, however, get it in combination form – tobradex, maxitrol, etc. The ointment is not too pricey. The way the specialist recommended it was BID, keeping in mind that it’s going to blur the patient’s vision, and then in between that, using PredForte. Amazingly, the patient did very, very well.

**Posterior Synechiae**

Posterior Synechiae is another reason for increased IOP. This can lead to the worst of the acute glaucomas. Our role in treating uveitic glaucoma is to prevent this from happening because it can lead to such a bad outcome. If we cannot prevent the synechiae from forming, we need to break them as soon as possible.

Figure 2 is an example of what a Posterior Synechiae looks like. This is a picture of some older synechiae – you can see the inferior portion of the pupil looks like it has been
cemented there for quite some time. The same can be seen on the other branches, as the white haze is forming around them. This is a patient who has been dilated after they’ve had their posterior synechiae form. Unfortunately, when we first examine these patients, we often cannot see the posterior synechiae right away. We will only see it after we have diluted them and they return to the room. Fortunately, we should be dilating every uveitis patient to make sure the uveitis is not in the posterior chamber.

As we dilate a patient with posterior synechiae, we will see something like this. It is important to note that once we see synechiae, we have to break them. We won’t know if the synechiae is newly formed or old as we examine the patient, unless you have a history. All synechiae are primary or first-time synechiae. As we look at these, we need to try our hardest to break them. I will share strategy to break them.

The difficult thing is that we cannot break old synechiae. In the patient above, I doubt we will break these. It’s very important to prevent them from happening in the first place, but when they do happen, to break them as soon as possible. Why don’t old synechiae break like new ones do? In order for the posterior iris to attach to the lens, it has to be sticky in the first place. That’s where the inflammation comes in. The posterior iris is in contact with the anterior part of the lens all day, every day. However, until it becomes inflamed or sticky, it does not actually stick to the lens. The iris requires a uveitis or some sort of anterior chamber inflammation to make it sticky. Once that happens, the ‘glue’ will stick the iris down.

The way I like to think of it is that a new synechiae is if you were to do an art project and stick down paper to other paper. Initially the paste is relatively sticky and you can move the paper around, remove it, or whatever you need to. However, leave the glue there overnight and that stickiness will stay and cement itself down. Once we have that old synechiae, we cannot break it because that glue has molded itself. Again, that’s why it’s so important to break them initially.

A question I will often ask is, “How many clock hours of posterior synechiae do you need before the pressure goes up?” The answer to that is 12. That may strike you as quite a lot – you may expect the pressure to start going up before that. Well, if you think about something different, such as Laser Peripheral Iridotomies (LPI’s), you can imagine the smallest LPI you’ve seen and they don’t have to be very big to let the fluid from the posterior chamber access the anterior chamber. Imagine that small amount on the lens-iris interface, and you can see where you probably don’t need that much room for the fluid to equilibrate and keep the pressure normal. Thus, we need 12 full clock hours to cause a pressure spike.

What are the two most important clock-hours, then, in posterior synechiae? Well, they are the 1st and the 12th. We know the 12th is important because if you don’t get the 12th, you don’t get increased IOP. The 1st is very important because if you never get the 1st, you will never get the 2nd, 3rd, 4th, etc. Once the 1st is adhered, then the lens-iris interface is much closer to each other, and so whether or not the patient gets another uveitis is difficult to tell the 1st time. We should assume, however, that the patient is going to get multiple recurrent bouts of uveitis. If the patient is going to get multiple bouts of this,
then we don’t want them to get the 2nd, 3rd or 4th clock-hour posterior synechiae. We should treat aggressively to break the synechiae, so there is never a 2nd, 3rd, or 4th. We have to be very aggressive with this.

If, for instance, we are worried about potential side effects of the medication, and we decide to be less-aggressive with our treatment, then we are setting this patient up for potentially more complications down the road because we weren’t as aggressive as we should have been today.

Let’s go over how we break synechiae. Again, you cannot break old posterior synechiae, and you cannot break peripheral anterior synechiae (PAS). If the synechiae is current, then we should treat aggressively with topical Pred Forte to reduce that stickiness, and we should use atropine 1%. Here is my strategy: the patient comes in, and they have uveitis. I’m going to dilate them, no matter what, with Atropine or Homatropine to get them comfortable. I want maximum dilation and maximal cycloplegia to make the patient comfortable. Often times after drop instillation, the patient will come back and there are no posterior synechiae. However, they will come back with posterior synechiae which I will see after dilation. If I see it after dilation, then I will instill a drop of 2.5% Neosynephrine.

I typically don’t as a rule use neosynephrine in uveitis, and there are a few reasons for this. One is that it can make the pain worse. Also, it can make it more likely that the patient will have problems in the future because it can actually break down the blood-aqueous barrier, and we don’t want that – we want to reestablish the blood-aqueous barrier. That’s actually one of the big benefits of Atropine and Homatropine – they help reestablish the blood-aqueous barrier. However, in this case, the trump card is breaking the posterior synechiae. I will use neosynephrine for that. So: the patient comes back, they have posterior synechiae, I will give them neosynephrine and often times that will break the synechiae. If needed, I will send the patient home with Pred Forte Q1h and Atropine to try to break it. Now, if the patient comes back and the synechiae is still not broken, then I will give them 10% neosynephrine. This is not something that I give out as a rule – I rarely use it. In fact, this is really the only instance I am using this. We should be cautious with 10% neosynephrine. We should do punctal occlusion, and should not give to someone with a history of heart problems. Keep in mind, however, that most of our patients are young and can handle 10% neosynephrine. They don’t have heart problems. Still, we should punctal occlude.

If this regimen still doesn’t break the synechiae, then you can do something that works in these rare circumstances; take a cotton-tip applicator and soak it in 10% neosynephrine. Anesthetize the eye, and just above where the synechiae are, gently rest that cotton applicator. For example, if the synechiae is at 12:00, you want to use the cotton tip applicator on the superior cornea. Again, gently. We have given someone a lot of Pred Forte and do not want to abrade their cornea and have to stop the Pred Forte, so again, be careful. This example shows you how aggressive I am with breaking posterior synechiae – we have to do it and want to make sure we are preventing potential problems in the future.
**Peripheral Anterior Synechiae**

What about Peripheral Anterior Synechiae (PAS)? PAS’s are very, very difficult to treat, and we cannot break them as described above, so we have to prevent them. If you take nothing home from this lecture, I would like you to know one thing and that is to prevent PAS. We have to be aggressive with our treatment to prevent it. I will talk to you about how to treat aggressively and how I go about treating aggressively later on in the lecture.

Now we cannot diagnose this without using gonioscopy, so we have to be able to use gonioscopy. Figure 3 shows what PAS looks like with gonioscopy. A question I have for you is how many clock hours do we have to have of PAS before we get an increased intra-ocular pressure? That depends on what the nature of the patient’s IOP is to begin with. If they have a somewhat tenuous relationship between production and outflow, it may not take much PAS before they get an increased IOP. If, on the other hand, the patient has a pretty resilient eye, they may need quite a bit more – maybe a few clock-hours. I think, either way, we could agree that once a patient reaches 6 clock-hours or more, they will have increased IOP. I don’t think anybody could have that much and not have increased IOP.

As I mentioned earlier, PAS is very difficult to treat. These are the worst of the chronic glaucomas to treat because most of our medications don’t work for this. Cholinergics don’t work, and they also set the patient up for worse pain and a breakdown of the blood-aqueous barrier just like neosynephrine would. Thus, we don’t want to use those. Medications that work on outflow don’t work quite as well, especially medications like Travatan, which can also increase inflammation. The biggest thing is that there is actually a barrier between the anterior chamber and the trabecular meshwork with a PAS, so things like SLT and ALT won’t work, and may promote more inflammation, as well. Laser PI’s don’t help, nor do surgical PI’s. This is why it’s so important to prevent PAS, because most of our medications don’t work well. Aqueous suppressors work to a degree, but still not very well. Most of these patients need filters, and these are very poor filter candidates – they are usually young, with an overly active inflammatory system and that can lead to scarring, and we don’t want scarring in a filter, we want an un-healing wound. By nature of the trabeculectomy, that is the desired result from the surgery. If you have a patient who inflames a lot, they will be very poor candidates for a trabeculectomy.
Figure 3, above, shows an example of PAS and we can see just superior and inferior to it are a pretty normal angle, though it is hard to see the detail in this photo. I can’t really see trabecular meshwork, but we can see the tented up iris, which is covering the trabecular meshwork. As you can see there the iris is in closer apposition to the trabecular meshwork, so this patient is more likely to get another PAS, and another, and another, building upon each other. Just like posterior synechiae, we really need to prevent the first PAS from happening, because what can happen is the next one can happen, then the next, and you can get what’s called ‘zippering shut’ of the anterior chamber. That leads to a very, very bad glaucoma, which is very difficult to manage. Even if there are just a few PAS’s, it’s difficult to manage, but it becomes increasingly more difficult the more PAS’s that are added.

Figure 4 is another example of PAS, and you can see how that is really tented up, bringing the iris closer. With PAS you don’t have to have inflammation for it to form – you can get it with SLT (Selective laser trabeculoplasty) or ALT (Argon laser trabeculoplasty). You can get it with primary angle closure, but it’s also very common in uveitic glaucoma because the iris can swell and actually bring the peripheral iris into apposition with the trabecular meshwork. Because of the inflammatory response in the eye, that makes it stickier than it typically would be, causing it to stick even more.

**Steroid Response**

I think this next explanation for increased IOP from uveitis is definitely the most overrated, over-diagnosed reason for IOP increase. I understand that this is an inflammatory statement, and most people will look at this and say, “Yes, but in my experience, it’s mostly been steroid response.” I want you to stick with me for the next few minutes as I go through why I am saying this, and I think you will see my reasons for it. I think you’ll see my reasons for why, even if it is a steroid response, we should be cautious about taking the patient off of steroids or lessening their treatment. I think we should still continue to treat aggressively.

We should be cautious with these patients. If we think it’s the steroids causing the increased IOP, then it might cause us to back off on the steroid and use something like Lotemax or Pred Mild or even back off completely and use something like an NSAID or an oral NSAID, and I think that’s a big mistake because the big things we want to do are to prevent bad outcomes in the future, and the two worst outcomes you can lead to, posterior synechiae and anterior peripheral synechiae, happen when there is more
inflammation in the eye. If we don’t treat as aggressively, we are setting ourselves up for the potential that the patient could actually develop these problems, and what we are doing is stopping the steroid for a short term IOP increase but may give the patient a long-term IOP increase that is very difficult to manage. We have to think about who we typically treat with this – we are typically talking about a young patient with a healthy optic nerve, who can handle a short-term IOP increase without complications.

This leads me to my most common reason for the IOP increasing, and I think it’s the most under-rated and under-diagnosed, and that is just that the eye is simply getting better. I think this is the reason why people misunderstand the steroid response. It’s a correlation but not a causation where we think one created the other; we start the steroid, the pressure increases, and therefore the steroid must have caused the increased IOP. That is just not the case with this – it’s much more common for the eye to get better. Again, I would argue that even if it is a steroid response, there are ways around this, and we’ll go through that.

So here’s how this works. What can happen with uveitis as it’s getting better is that the ciliary body and trabecular meshwork both improve at the same rate. As I talked about earlier, the trabecular meshwork can have problems with causing, and in a minute we will talk about how it can be inflamed. As we’re treating it, the trabecular meshwork will get better. The ciliary body will downgrade its production as it’s inflamed to produce less aqueous. That’s fine if there’s less aqueous, and less function of the trabecular meshwork, that equals out. What can happen as the eye is getting better is that the ciliary body and trabecular meshwork get better at the same time, so the pressure will not change.

We can also conceive of a situation where the trabecular meshwork improves quicker than the ciliary body. If this happens, then traditionally the patients will have a lower IOP. However, if the ciliary body improves quicker than the trabecular meshwork, then we can see an increased IOP. Again, the temptation in this is that we would decrease the steroid because we are worried that it’s a steroid response when, in reality, the eye is just getting better. Keep in mind that when we are treating uveitis, typically we are treating young patients, and this is a very short-lived condition. We have to weigh out preventing PAS, preventing posterior synechiae, and again re-establishing the blood-aqueous barrier so the patient doesn’t have more uveitis in the future. If we understand this, then we will be much more likely to stay the course with our treatment, and not back off. Again, we must treat these people aggressively.

This leads me to an example of a patient I had recently who had seen a local eye surgeon and then was sent to us because they were having a difficult time managing the uveitis. As I looked through their notes, what had happened was they were treating the patient, and then the pressure would increase. They thought, “Steroid response – I really have to back off on this.” Well, once they backed off on it, the inflammation would get worse. Finally, the patient was referred to us. We treated the patient aggressively with steroids and cycloplegic, and the pressure increased to the high 20’s in a young patient with a normal optic nerve. We decided to keep him on the steroids and stay the course. What happened was the eye got better; the uveitis got better, the pressure got better, and we didn’t need to treat the IOP spike. That was proof that it was not a steroid response. The patient was still taking
steroids all the way to the end of the taper, and the pressure reduced and got better, even on the steroids. Now, when you’re in the thick of it, you won’t know if your patient is going to be one who has an IOP spike due to steroid response or due to the eye getting better. I would urge you to stay the course, keep the patient on the steroid and ride it out. Now, if the pressure gets too high, you can of course pull out the medications that can lower the IOP if need be. We will talk about some situations like that later on.

Another example for increased IOP is when the trabecular meshwork is inflamed. We don’t have very good evidence of either of these listed causes being the main cause, or if it’s directly inflamed trabecular meshwork. There are no direct pathology studies for someone with herpetic uveitis or Posner Schlossmann, where they had the inflammation, the patient died, and we were able to do pathology studies on them. Thus, this is a presumed inflamed trabecular meshwork. However, you can see where the trabeculitis would lead to increased swelling and size of the pillars of the trabecular meshwork, leading to decreased outflow.

Posner Schlossmann is a misunderstood and often over-diagnosed condition. What Posner and Schlossmann found was that the patient had to have a very, very mild uveitis. I have seen Posner Schlossmann where I have physically counted 2 or 3 cells. That is how mild the uveitis is. They have very high IOP, typically into the 30’s or 40’s or even higher. The patient is usually asymptomatic. The reason this is over-diagnosed is a lot of people treat any increased IOP in a patient with uveitis as Posner Schlossmann and again, that’s just not true. It needs to be a very mild uveitis with a very high IOP and minimal symptoms. This is a diagnosis of exclusion – we look at the eye and the patient doesn’t have posterior synechiae or PAS. We haven’t started any treatment and the eye is not getting better because this is a new uveitis. We say, “Well, it must be an inflamed trabecular meshwork,” especially because there are so few cells, and so little inflammation. The trabecular meshwork must just be overly sensitive to this, and the patient has developed trabeculitis.

To treat these patients in the short-term, we are often very successful. We treat them with Pred Forte and an ocular hypotensive, either one or the other or in combination. In the long-term, however, it’s often very complicated. The reason it’s so complicated is that these patients don’t have a lot of symptoms. They don’t come in and say, “My eye is really red, it’s really inflamed.” Often times their pressure doesn’t get high enough for them to come in with symptoms of increased ocular pressure. If the pressure is in the 50’s or 60’s, they may have symptoms, but if it’s only in the 30’s or 40’s, it’s not likely that they will have symptoms of increased IOP. My strategy for these patients is to treat them with a low dose steroid. The goal behind this is to prevent the inflammation from getting too bad, and keeping the trabecular meshwork in line.

The other strategy is to add an ocular hypotensive. Traditionally, people will use something like Alphagan, Timolol, or a carbonic anhydrase inhibitor such as Trusopt. Often we use these in combination. The important thing with the ocular hypotensives is, for example, say a patient
traditionally has a pressure of 18, but when they are inflamed they go up to 40. If we use the ocular hypotensive, they may have a baseline pressure of 12 and when they are inflamed they only get up to high 20’s. That may still be too high for the patient to handle, but we are sort of blunting the effect of the increased IOP. These patients need to be followed very frequently, at least every 6 months to check the pressure, anterior chamber and even possibly consider doing gonioscopy on these patients. We also should check the nerve and do a visual field to check for any progression.

Something that I have learned in my practice that has helped me immensely is this clinical pearl: trabeculitis can be from Herpes Simplex. This will have a triad of inflammation in the anterior chamber, corneal edema, and a moderately increased IOP. When I say ‘moderately increased’ I typically mean 30’s and above, though I would be suspicious of high 20’s in the right patient. When I look at these, the bells start ringing in my head and the light bulb goes off and says, “I need to consider Simplex.” The reason to consider Simplex is two-fold: one is that it may be a little more difficult to manage, a little more recurrent, so we need to pay attention to that. The second reason is that if we don’t think about it, and put the patient on a lot of Pred Forte, we may introduce the possibility that the patient may form a dendrite. We have to cover these patients with Viroptic, otherwise they get a dendrite and we have to discontinue the Pred Forte, which makes it much more challenging to prevent those other complications that we are so worried about.

The other thing that tips me off to Simplex is the patient’s age. We’ve talked a few times about how it’s much more common to get uveitis in younger patients. When you have a patient who’s in their 50’s, 60’s or older, and this is their first uveitis, or they have developed a recurrent uveitis, I would be very suspicious for Herpes. Again, they don’t have to present with a dendrite – that would make it really easy, and we would know what that was if they presented with both a dendrite and a uveitis. It’s much more complicated when the patient presents with just the uveitis. Again, pay attention to the patient’s age, the Herpes Simplex triad, and if you suspect it, cover the patient with Viroptic.

This is pretty easy in the VA. Viroptic is not too terribly expensive and I don’t have to use it too often. But, if the patient had to pay for it, I would want to be pretty certain of this. As long as your clinical suspicion is high, I think the yield would be high enough to use Viroptic to cover yourself.

The last explanation for increased IOP from uveitis is that the patient simply has a chronic uveitis and chronic damage to the trabecular meshwork. This is also a diagnosis of exclusion. We are looking for posterior synechiae, PAS, a very hot and red uveitis, steroid response, or the eye is getting better. This is definitely not similar to Posner Schlossmann where they have very few cells and very few symptoms.

This is, however, very typical for Fuchs’ Heterochromic Iridocyclitis and these patients will have a low-grade, smoldering uveitis that is quite asymptomatic. That makes this very difficult to manage from that perspective because the patient is quite asymptomatic. It is also difficult to manage because the cells just never really go away. The recommendation for this is to treat with Pred Forte and try to get the
cells to go away, but give up quickly if there is not a response. Often times these patients are simply on ocular hypotensives alone chronically, to help keep them from having chronic problems. If that doesn’t work, we may need to go to surgical means to reduce the pressure in the eye. Again, in this case, we are looking for a uveitis that doesn’t respond well, chronic uveitis is a diagnosis of exclusion, but we’ll see it fairly often.

Evaluation and Treatment

Again, the 7 reasons for increased IOP are: a clogged trabecular meshwork, posterior synechiae, peripheral anterior synechiae, steroid response, the eye is getting better, the trabecular meshwork is inflamed, or there is chronic damage.

We have spent a lot of time over the past 40 minutes during which I have been trying to simplify your approach. I’ve used the pathophysiology to help guide you where to look, and what to look for. How to go through a checklist in your mind to go through the various things that can cause increased IOP in uveitis. Once you can check all of them off, then you can arrive at the cause of the glaucoma.

<table>
<thead>
<tr>
<th>Reasons for Increased IOP</th>
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<tbody>
<tr>
<td>Clogged TM</td>
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<tr>
<td>Posterior Synechiae</td>
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<tr>
<td>PAS</td>
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<tr>
<td>Steroid Response</td>
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<tr>
<td>Eye is Better</td>
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<tr>
<td>Inflamed TM</td>
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<tr>
<td>Chronic Damage</td>
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We have to do gonioscopy looking for a PAS if the pressure is increased. We have to look for posterior synechiae and if they are there, break them. If not, we have to prevent them. Consider that there is a steroid response, but more than likely it’s that the eye is getting better if we cannot find another cause. Then we look for clogged trabecular meshwork. Again, you’re not going to see that, but you will see either a thick aqueous or a very angry red eye with a lot of cells (3+ to 4+).

This brings me back to the very beginning when I talked about experts making things simpler by knowing what to pay attention to, and this is a perfect example of that. We have taken a very broad topic that’s scary for a lot of doctors, and is confusing, that we have simplified by going through the pathophysiology, going through how to do the examination, and now we have come to a simplified approach. We know what not to pay attention to; we know we don’t have to pay attention to circumlimbal flush or meiosis. We don’t have to necessarily pay attention to the pain and photophobia, granted we want those to be better and the patient to feel better, but it’s not going to guide our diagnosis and treatment as much as these other things.

Once we look through all of the causes of increased IOP’s, then we want to look at the diagnosis of exclusion. Again, Posner Schlossmann has a very, very mild uveitis and a very high IOP with an asymptomatic patient. Chronic damage to the trabecular meshwork is much more likely from something like Fuchs’ Heterochromic Iridocyclitis.

Our treatment goals in uveitis broadly are to decrease symptoms, prevent sequelae, and to improve the patient’s quality of life. The sequelae I am thinking about are PAS, posterior synechiae, cystoid macular
edema (CME), cataracts, and we also want to prevent further episodes. It’s hard to tell on the first uveitis if the patient is going to have multiple bouts of uveitis, but we should assume that they are. Therefore, we should assume that the posterior synechiae that the patient has could turn into more. The same with the PAS – we should assume the patient will have more in the future and have more risk for developing PAS. We should assume there could be further episodes to further break down the blood-aqueous barrier. We have to treat aggressively today to prevent those things from happening.

For our treatment goals to treat symptoms and prevent sequelae, we want to use Pred Forte very aggressively and Homatropine or Atropine. To improve the quality of life, we are going to do a systemic evaluation. What I do to treat aggressively is to give Pred Forte every hour. I got this from two very smart uveitis doctors, Dr. Smith and Dr. Nozik who wrote a very, very good book on uveitis. Their definition of treating aggressively is that everybody should be treated every hour, so the patient is putting in 16 drops a day. We might have new medications like Dexamethasone ointment or Durezol that could be even more aggressive. Keep in mind the more aggressive we are, and the stronger the medication, the more likely we are to see a steroid response. You can get a steroid response, but it is less likely with Pred Forte than with Dexamethasone or Durezol.

If I’m trying to break posterior synechiae or the patient is quite symptomatic, I will use Atropine QD. Otherwise, I’m using Homatropine BID. There are a few exceptions to this: if the patient is aphakic they are not likely to get posterior synechiae or PAS, and especially if it is immediately post-op. Right after their cataract surgery, a lot of these patients will have lingering inflammation. Those patients are not likely to get multiple rounds of uveitis. If the patient has traumatic uveitis, it’s also probably a ‘once and done’ situation. With these patients, I’ll treat them anywhere from QID to Q2h, often times Q2h or 6 to 8 times/day, as far as the number of drops we are getting in each eye.

Case 1

We have now talked for about 45 minutes on all of this. Let me clear this up for the next few minutes with just some cases. These are something you could see coming into your office. I want you to understand exactly what my thought process is and this will help wrap up a lot of what we talked about today.

Let’s say we have a 30 year old male who has 3+ cells in his right eye, but is completely quiet in the right eye. Pressure is 24 in the right eye, 14 in the left. We can assume that most likely the pressure in the right eye was the same as the left eye, but now we are seeing a pressure increase. What could cause this?
We have to look for a PAS doing gonioscopy, and to look for posterior synechiae. It’s brand new, and there’s no treatment that’s been started. It’s not Posner Schlossmann because there are too many cells. It’s not chronic damage. Most likely it will be clogged trabecular meshwork in this patient.

What do we do about this? Treat them aggressively! I would use Pred Forte q1h OD and Homatropine BID OD. If we see the pressure increase, and if I were a betting man, I would bet that we see the IOP in that right eye increase by the next visit. Stay the course and keep them on the therapy, and we will ride it out. If it gets to the point where the pressure is too high, you can consider adding an ocular hypotensive. However, again, in this young patient, with a short duration of increased IOP, you probably don’t need to.

**Case 2**

Case 2 is very similar to Case 1, except that the pressure is a bit higher in the right eye this time. Most people have a ‘flinch point’ of treating pressures that are in the high 20’s, low 30’s or something like that. This is getting to most doctors’ flinch point where they want to start treating that pressure. We can assume again, in that right eye, that the pressure used to be about 18, or maybe just a little higher. I would anticipate after the treatment, the patient would have even higher pressure. We look for PAS and posterior synechiae. We haven’t started treatment, and we haven’t seen only a few cells, and again it’s not chronic, so it’s likely a clogged trabecular meshwork.

Again we will treat this patient aggressively with Pred Forte 1% Q1h and Homatropine 5% BID. Should we treat the IOP? Again, this is a 30 year old who has a very short course of the disease, and who probably has a very healthy optic nerve. It’s really going to be up to you whether or not you are comfortable with that pressure. I could see very smart doctors saying, “I’m not going to treat it – it’s very short lived” and I can see others saying, “32 is just too high – it doesn’t sit well with me.” Personally, I think either way is fine.

**Case 3**

What about a patient who’s had many episodes of uveitis but the eye is currently quiet and the pressure is up? We are not treating this patient, there is no current inflammation so the trabecular meshwork is not clogged or inflamed. It’s likely that this patient has PAS or damaged trabecular meshwork.
What do we do with this? In this, since there is no inflammation to treat, we need to treat the IOP. We should treat this patient like glaucoma, except that we should not do a prostaglandin or a cholinergic. Some people will treat with a prostaglandin, but they will do it cautiously, and I would urge you to do it cautiously. You should not use a cholinergic because that could promote inflammation, which we definitely do not want. I would be cautious with ALT and SLT because it can make more PAS, and can also incite inflammation.

This patient likely needs a filter, and as I mentioned earlier, this patient is not a good filter patient. She’s young, with a very hyperactive inflammatory system, and uveitis patients as a rule don’t do as well with a filter. This patient is probably going to need something like a beta blocker or an alpha agonist to lower their pressure.

**Case 4**

Now what about someone who already has glaucoma and gets uveitis? In this patient, first off, we should consider if this is herpetic, and pay attention to that. In this patient whose pressure is typically 16 and well-controlled on Cosopt and Xalatan, they get uveitis with an increased IOP.

What do we do? It really depends on the patient. Is this a very bad glaucoma or is this a very mild glaucoma? If this patient is fixation-threatened, I would say that we need to be quite aggressive and we would have to be quite creative about lowering the pressure. However, if it’s a mild glaucoma, then this patient may be able to tolerate a pressure of 24 for a couple weeks.

The first thing we should consider is discontinuing Xalatan, as it might insight inflammation or make it worse. Keep in mind that we are pouring on a lot of steroid, so it may not make too much of a difference to take the patient off of it. I think, though, that most people would say to discontinue the Xalatan.

There are so many options with this patient. I think some creative options would be to use Iopidine, we could use an oral carbonic anhydrase inhibitor, and in this patient we could switch to Alphagan or add Alphagan. Iopidine is a very poor long-term strategy for this patient – it has a high rate of tachyphylaxis and a high allergic rate, so we don’t want to use this long-term. For a short-term pressure decrease, though, it could be great, especially in that person you just want to get over the hump until the inflammation is gone.

The same applies to oral carbonic anhydrase inhibitors. There are a lot of systemic side effects and it’s not a good long-term strategy, but an excellent short-term strategy. Again, it’s much more difficult if the patient has glaucoma and needs treatment for uveitis. We should be cautious with that patient, but be creative.
I hope this lecture was able to help you simplify this discussion, and simplify this in your mind. By using pathophysiology we can guide our exam, and guide our treatment. Remember to be aggressive with treatment, stay the course, and if the pressure increases, it’s most likely the eye getting better. If you have questions, feel free to email me. Thank you for your time.

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