

Dr. Jason Barnes:

Hey there, welcome to another episode of ENT in a Nutshell. My name is Jason Barnes and today we're joined by neurotologist Dr. Brian Neff, and we'll be discussing otitis externa. Dr. Neff thanks so much for being here.

Dr. Brian Neff:

Thank you.

Dr. Jason Barnes:

Today we'll talk about acute otitis externa, chronic otitis externa, as well as malignant otitis externa. I did just want to highlight that there's a clinical practice guideline about AOE specifically, and Dr. Neff to start what kind of symptoms do patients present with when they have an otitis externa?

Dr. Brian Neff:

Typically, it depends on the timing. So if it is acute otitis externa which is two weeks or under, then it will be primarily pain but they'll also complain aural fullness and hearing loss. Chronic tends to be less painful. They tend to complain more about itching and fullness with some drainage. So between the two that kind of covers all of the symptoms I think you can see with otitis externa.

Dr. Jason Barnes:

When you see folks in clinic who are complaining of these types of things otalgia, otorrhea, oral fullness. What are you looking for on clinical exam? Can you walk us through how you evaluate these patients in clinic?

Dr. Brian Neff:

Essentially I think there's two important components. One and primarily is the otoscopic or even better microscopic examination, and then I like to do a cranial nerve examination and possibly even palpation of the mastoid and upper neck for lymph nodes. But primarily it's the microscopic examination where you're trying to look in the ear canal to see its status. Again, acute otitis externa tends to have a lot of swelling and discomfort, just with pulling on the pinna and trying to manipulate your speculum into their external canal, you'll see a lot of edema sometimes otorrhea and pain primarily, whereas chronic otitis externa has a variability. They don't have as much pain, sometimes they do but you'll see various levels of skin thickening I think, that's causing narrowing from none to quite a bit and they have a lot more debris I think that you can see that you want to clean. So I think those are the main things.

Dr. Jason Barnes:

Are there any other types of symptoms maybe more systemic symptoms or other constitutional symptoms that they might complain of?

Dr. Brian Neff:

There's always the worry about otitis externa... sorry, malignant otitis externa or even sometimes a malignancy of the skins such as basal cell or squamous cell. So the malignant otitis externa patients tend to just look sicker. So they can have fever or they can have lymph nodes on examination but significant swelling and redness around the ear I think are important to look at, but it's mostly a localized problem.

Dr. Jason Barnes:

And are there any risk factors that you're asking patients about the tune you into the fact that this is otitis externa?

Dr. Brian Neff:

Primarily I think acute otitis externa you're looking at anything that causes immunosuppression. So chronic tends to be... I'm asking more about skin infections or skin conditions, but acute otitis externa you want to know about diabetes, but anybody that's neutropenic from anything you can imagine has the potential to have a more severe otitis externa. So somebody that's been through bone marrow transplantation or something like that, you got to worry more about malignant otitis externa or I like to call it skull base osteomyelitis. Chronic otitis externa I think skin conditions that I kind of click through in my mind would be likened plainness, psoriasis but really any type of dermatologic condition can be involved in the ear canal. I also kind of look at systemic fungal infections under the nails, toenails, fingernails. They can get a dermatophytid reaction, it's almost an autoimmune reaction of the ear canal from systemic fungal exposure.

Dr. Jason Barnes:

And what's the breakdown you feel in terms of kids getting this versus adults getting this, and what are some predisposing factors that separate the two?

Dr. Brian Neff:

Primarily, kids get acute otitis externa. So it's commonly called swimmers ear and it's from water exposure typically in the summer months, but you see some adults that get this. Primarily I think there's a variance in the diameter of ear canals and people with narrower ear canals or curved ear canals tend to get acute otitis externa. Chronic otitis externa is primarily an adult phenomenon. Malignant otitis externa or skull base osteomyelitis is definitely an adult disease, and I think it usually comes in patients that are 60 and older, although it can be really any age in an immunocompromised patient.

Dr. Jason Barnes:

How much do you dive into the history about trauma with things like Q-tips, bobby pins that kind of thing. Does that make a difference?

Dr. Brian Neff:

I think it does. I have to remind myself to talk about that stuff, because it's probably something that makes treatment... sorry, makes diseases of the ear canal refractory to therapy. I think that's the key. So it's better up front just to tell them to avoid Q-tips and anything that's manipulating the ear canal, because it feels good to itch it or to manipulate it sometimes but they're just breaking down the skin barrier and allowing any organism to just penetrate deeper into the tissues. So they also need to keep their ear dry while we're treating.

Dr. Jason Barnes:

So we've talked about presentation and you've started to talk about pathophysiology when you're talking about chronic irritation or trauma. I first just wanted to start our pathophysiology section with discussing some of the normal flora that we find in the ear canal. Can you tell us a bit about what's normal for the ear.

Dr. Brian Neff:

Really, any bacteria that's on the skin can be, but mostly gram-positive such as Staph aureus, staph epidermidis. But there are people that are colonized with typically thought to be pathogenic bacteria. So there are asymptomatic people with Staph aureus, Pseudomonas but I think they're being held in check by these healthier flora and they're not clinically presenting with any symptoms. But you can also get anaerobes, diptheria and strep. So it's really just pretty much any bacteria is potentially possible.

Dr. Jason Barnes:

I next wanted to kind of walk through acute, chronic and malignant otitis externa, and their particular pathophysiology. Starting with the acute you said this is pain of greater than 48 hours less than three weeks duration. What else do we know about the pathophysiology of acute otitis externa? What causes this?

Dr. Brian Neff:

It's almost always bacterial. I don't see a lot of it because it does respond very well to treatment. So Pseudomonas is the primary bacteria that is at fault for the vast majority of patients. It can be fungal. So there are Candida species Aspergillus species that can present as an acute infection, but fungal infections tend to be more in the subacute or chronic category.

Dr. Jason Barnes:

What's the sequence of events or the cycle that leads to this infection?

Dr. Brian Neff:

Typically, first there's a breakdown of the skin and wax rumen barrier that can be from frequent swimming, Q-tip use. Once that happens you see occlusion of the apo-pilo-sebaceous units, which then lead to swelling and edema. The skin starts to slough and collect in the ear canal, the pH of the ear canal goes up. Typically, it's mildly acetic with the cerumen and then bacteria and fungus tend to love that environment.

Dr. Jason Barnes:

So we've talked about acute, can you now tell us a little bit more about chronic? How does that differ from acute both clinically and pathophysiologically?

Dr. Brian Neff:

First, I think that the pain is much less. It's predominantly itching fullness debris possibly otorrhea and hearing loss. The length of symptoms is typically two to three months or greater, oftentimes years it can affect both ears. I think that's another thing that is not seen in acute otitis externa, whereas chronic otitis externa tends to... can very often be bilateral. And then I think there's a shift in because from acute otitis externa to chronic otitis externa. There's still certainly a subset of chronic bacterial infection but I think personally is a minority and then you start to see a rise in fungal infections and chronic skin conditions. I call it atopic otitis externa, or some people call it chronic eczematous otitis externa. So you start to see that type of thing much, much more commonly.

Dr. Jason Barnes:

The next thing I wanted to ask you about is myringitis, can you tell us a little bit about what that is and where it fits on the spectrum of otitis externa?

Dr. Brian Neff:

myringitis is essentially an inflammation of the epithelial layer of the tympanic membrane. The cause for it is really unknown. That's the problem. We don't know a lot about it. I think it's commonly thrown in by most practitioners as it's part of the infection, but truly I think it is separate. We're not sure why some people develop myringitis when the vast majority of people with acute and chronic otitis externa do not develop myringitis. So it's a different process in my mind that needs to be noticed, because it does make treatment more refractory. It just as hard to get rid of chronic myringitis.

Dr. Jason Barnes:

Next I wanted to talk about malignant otitis externa also known as necrotizing otitis externa or as you said skull base osteomyelitis, can you tell us about this disease process, how it progresses, and what it can mean for the patient?

Dr. Brian Neff:

Again typically, it's in an older patient with some type of immunosuppression, or diabetes. Now, you should not think of it in a younger patient that meets those criteria. But the typical person is your 60 year old, diabetic that has acute otitis externa for whatever reason. It seems to me in my practice that it's somebody was flushing their ear canal for wax, and they developed an acute otitis externa better just unable to fight off the Pseudomonas infection. Which is... what is the typical organism causing skull base osteomyelitis, so it goes through the same process I think is acute otitis externa, but then it gets into the bone of the ear canal. People say that passes through the fissures of santorini into the soft tissue surrounding the ear canal, and you start to see two things that make me concerned about it is one the type of patient and then specifically if they're complaining of pain, that's just more than you normally see with an acute otitis externa. So one of the things that if you hear it should be concerning is pain that's severe enough to be waking somebody up from a sleep or at night.

That starts to concern me and you have to judge the person's personality, but you have a fairly stoic person that's complaining of a lot of pain those are some tip offs. Secondly it's not getting better with the standard therapies. You should be better from otitis externa in a couple... in a week or so. So it tends to be that I've treated with ciprofloxacin for a long time now and it's just terrible pain and getting worse. And then on exam I think the clincher is seeing granulation at the bony cartilaginous junction, and I've seen it just be occlusive. So it's like you don't just say, "Oh, it's all through the ear canal." That's not it. But typically it's just some granulation tissue that you see at the bony cartilaginous junction, especially kind of anterior and inferior. If you see that, that's kind of very typical of otitis externa... I'm sorry, malignant otitis externa.

Dr. Jason Barnes:

What do you have on your differential diagnosis? I know it can be long, but can you run us briefly through what are you thinking when you see these patients?

Dr. Brian Neff:

Having just kind of a list to run through in your head is important. Some things are more common and acute or chronic but just a list of things to think of would be fungal otitis externa, atopic or eczematous dermatitis of the external canal. Some of those patients can have asthma or eczema as tip offs to that.

Other skin conditions like we talked about psoriasis and lichen planus, and myringitis can coexist with otitis externa or be solely present as the cause of otorrhea, otitis media with the hole in the eardrum greening and causing a secondary otitis externa. Medial canal fibrosis typically starts kind of in a myringitis picture, and then gets very exuberant and then the medial canal fibrosis part of it is where the medial canal starts to fill up with scar tissue or fibrotic tissue. We've already talked about skull base osteomyelitis. I think important... very important is for somebody not getting better with your standard treatment of otitis externa is skin malignancies. There's really two that are common with a basal cell and squamous cell. Basal cells tend to be more towards the opening or meatus often times involving some part of the pinna and growing in, but I've seen a few basal cells just to the external canal.

Whereas squamous cells can be anywhere, they can be on the pinna at the opening but they can primarily start even in the deep ear canal. So anybody that's not getting better you want to start to look for all sort of bleeding lesions which can be very difficult, but sometimes they need biopsy. It can be an infected hair follicle or furuncle. Then there are some systemic diseases such as vasculitis, the one that I keep in mind is GPA, which used to be called Wegener's granulomatosis. Contact dermatitis, Ramsay Hunt Syndrome with VZV, radiation induced osteoradionecrosis. Finally, we end up with the external canal cholesteatoma or keratosis obturans, which I think the different difference between those two things are there more chronic. So it's usually in the chronic otitis externa kind of differential, and you really have to see a lot of collection immediately of skin in the canal, and then start to see bone exposure. So I don't think of those things typically in the acute setting.

Dr. Jason Barnes:

Next I wanted to move on to workup. It seems that a lot of the workup is involved in the physical exam, but can you tell us about the role of culture in these patients?

Dr. Brian Neff:

There are a lot of different philosophies and I don't know if one is absolutely right over the other. Specifically if you are seeing a fresh, straightforward acute otitis externa patient that from frequent swimming, I don't think a culture is necessary in that instance. You can treat them for the typical bacteria with antipseudomonal topical therapy, and you need to follow them, they need to get better and so I don't think it's necessary in that person. But if you have somebody that has an acute otitis externa that's not getting better again, you want to start to think of other things or is this skull base osteomyelitis do they fit that profile? But if somebody has been previously treated, I like the culture because it tends to change what's going to be found. Sometimes it's refractory too, it's not Pseudomonas. It's something that's relatively refractory to what's being used or sometimes I've seen where over treatment with ciprodex has pushed the original bacterial infection to a fungal infection.

Sometimes fungal infections are very obvious, but sometimes they're not. So I send it for a... I culture treatment refractory otitis externa, and I culture for fungus, bacteria and I'll even send it for mycobacteria because I've seen probably five to six cases of external canal mycobacteria infection in my career.

Dr. Jason Barnes:

Is there any role for lab workup or lab studies to be obtained in these patients?

Dr. Brian Neff:

I think that if you're thinking of one of the rare systemic diseases if you've somehow gotten to that part of your differential you can, so sending off a MPO and PR3 for vasculitis, those diagnose not only GPA

but other types of vasculitis you can start to do that but routinely I don't... Some people like to have a said rate to follow more for treatment resolution in malignant otitis externa or skull base osteomyelitis, but I don't routinely get systemic laboratories.

Dr. Jason Barnes:

What about the role of imaging in these patients?

Dr. Brian Neff:

Again, for straightforward acute otitis externa without risk factors for immunocompromised, I don't think there's a role for imaging. I also don't think there's a role for somebody that has a fairly straightforward story in exam for chronic otitis externa especially if there's not a lot of pain involved. I think the role of imaging starts to come in when you're worried about either an alternative source of otorrhea. So maybe you have a perforation present and there's a lot of swelling and you can't really tell where the otorrhea is coming from, is it middle ears, is it external ear. So there can be some role if you're thinking this may be more of a middle ear process, but I think primarily it's for skull base osteomyelitis. So if you have a patient that you think that has that, imaging I think is warranted.

Dr. Jason Barnes:

Can you tell us about the role of technetium and gallium scans in the diagnosis or tracking of skull base osteomyelitis?

Dr. Brian Neff:

Due to being unfamiliar with kind of that niche area of radiology, they're not utilized very often. They're hard to order trying to understand all of the different radio isotopes that they use makes that part difficult. So I frequently see CT and MRI scan which are very valid imaging for malignant otitis externa. I would say that you have to be careful CT doesn't always look abnormal right away. MRI scans show really only the soft tissue component so you're missing... It's more of an adjunct, it shows soft tissue involvement of say the parotid or upper neck. Radionuclide skins I think do play a role especially if your CT scan is not showing a lot of bony changes and you're very suspicious for skull base osteomyelitis. So you could do a technetium scan which is very sensitive for active bone infection but it's not very specific. It can get the positive and malignancies or other things, and it also is not very good at tracking disease resolution. It will remain positive for a very long time, possibly even permanently and that's the same problem we see with CT scans is you can't really... once there starts to be bone erosion, you can't follow it for resolution because that never really normalizes.

Gallium scans are thought to become positive with active infection and then go negative once the infection is resolved. I think this is where I see a lot of different types of radioisotopes used by various radiologists. So in working in concert with them I think is very important. They could be using some type of Indian study or tag white blood cell but the idea is that something that shows active infection and then resolves when that infection is gone, that typically start to be the gallium scan.

Dr. Jason Barnes:

And what is the role for biopsy in these patients? Do you find yourself biopsying these patients very often?

Dr. Brian Neff:

If I see granulation tissue in the ear canal that gets biopsied. So yes I think it's important to rule out a malignancy. Malignancies can be very painful, they can have cranial nerve changes. So they really mimic each other and I think if you see granulation tissue you should biopsy it.

Dr. Jason Barnes:

My final question before we move on to treatment is how do you distinguish otitis externa from something that's a more systemic disease? How do you distinguish it from something like osteoradionecrosis?

Dr. Brian Neff:

Osteoradionecrosis I'll start with that is based on the history they received a significant radiation dose to the area. Typically, the classic example is a parotid malignancy that's received radiation, and then there can be pain with osteoradionecrosis that can be quite severe. You have debris, you can have swelling but I think the key difference is the history of the radiation to the area, and then on exam you start to see bone exposure and oftentimes it can be very speculated and there's breakdown of not only the skin but the bone in the ear canal starts to break down and you see almost spitting pieces of bone into the debris. In terms of systemic disease I think you don't think of those things right off the bat as in your differential, but if you're starting to run into treatment refractory disease, you can start to look at systemic vasculitis or systemic skin conditions that could be at play causing problems in the ear canal.

Dr. Jason Barnes:

Next moving on to treatment, I think this is going to be really important aspect of this episode. Can you tell us how you think about your treatment options, and maybe take us in a stepwise fashion of how you treat these folks for AOE and COE?

Dr. Brian Neff:

I'll start with AOE. When you're examining the ear you have to judge whether or not there's enough room for a topical treatment to get down in the ear canal. There's also a lot of resistance rightfully so due to pain of letting you to bleed a lot. So if there is over 50% narrowing as a rough guideline or you're unable to remove a lot of debris err towards placing a wick so that the therapy will get down in the ear canal. A wick shouldn't stay in place longer than seven to 10 days. I find though that frequently with therapy you'll get a call that the wick fell out, and that's not always a bad thing. That means the edema might be resolving but a wick or no wick and... so then if you're talking about therapies, I like for acute otitis externa ciprodex because it has a powerful topical steroid in it, mixed with an antipseudomonal and whether that's Cipro HC that's what I like to use. The other reason is that it's middle ear safe and you can't always tell if there's a perforation, there's no odor toxicity.

So that's usually my first line therapy, but sometimes you run into allergies or cost considerations and so you can do acidification therapies which would include acetic acid or vinegar, white vinegar. These can be homemade or they can be prescription where they mix the acetic acid with the hydrocortisone, boric acid and alcohol can be used. I find that's more helpful in canal wall-down ears, and it's difficult to obtain because not a lot of pharmacies have knowledge of it and how to compound it. But boric acid and alcohol can be used but you want to make sure that anything that you're mixing with alcohol, that you know that the tympanic membrane is intact not only for comfort but alcohol is a... it's pretty ototoxic.

Dr. Jason Barnes:



So that's the treatment for AOE. Can you now walk us through how you think about the treatment for chronic otitis externa?

Dr. Brian Neff:

Again, you have some of the same options you do for acute otitis externa. There is a small subset of patients that it's chronic bacterial. I would think that there are more in the group of patients that maybe aren't being compliant with Q-tips and are making it treatment refractory. These are the patients that I start to culture because they've been multiply treated. So you're going to hopefully have some help on should I continue antibiotic or more or likely I've seen a great rise in fungal infections. So there are a lot of topical antifungals primarily are three that I think of, I use clotrimazole 1% solution or lotrimin for any Candida species. I also use it if I see in the office a patient that has fungal spores, and they can't afford a more directed therapy like voriconazole topical solution. But typically if I have an exam or culture, somebody that grows out Aspergillus which is super common clotrimazole and lotrimin don't work very well.

So I like to use voriconazole 1% in those people. Occasionally you'll find some mucor species or other dermatophyte type of fungus that require amphotericin 0.15% ophthalmic. Again, I think your culture is very helpful. There are the acidification and antiseptics that you can use on chronic. We've talked about the acetic acid and the boric acid and alcohol or water. I like a lot of betadine, you can use 10% I think is kind of the most common or half strength. I've had patients use full strength without problems but betadine can be helpful for bacteria or fungus. Then I like to use gentian violet, which is an old topical therapy that's good for bacteria and fungus.

Dr. Jason Barnes:

What about the application of topical steroids in these patients or immunomodulators, is there a role for that?

Dr. Brian Neff:

Certainly, and again in the chronic otitis externa spectrum. If your differential has lead you to atopic dermatitis or eczematous otitis externa, or a skin condition like lichen planus or psoriasis of the ear canal. You can certainly use topical steroids or immunomodulators in the ear canal. I think when you're looking at purely using these... these are somewhat immunosuppressive and I like to have a culture showing that either normal flora is present or at least not having a specific known pathogen that's common like Pseudomonas or Staph aureus, before I start to use these. But some of the things that I find helpful I usually start with fluocinolone solutions 0.01% which can be used BID. You can increase the potency and use something like clobetasol 0.05% solution, you have to be very careful with this it is very potent and prolong chronic use can lead to bone exposure, or osteonecrosis. So you probably want to limit that to a couple of weeks.

Lastly, I find tacrolimus is very helpful. It can be used alone or in mixture with fluocinolone twice a day. And again I like to limit this to no more than three to four weeks of use before you check up on them. The reason is that tacrolimus has been found to potentially be a risk factor for developing skin carcinomas with chronic prolonged use. So you do have to monitor them if you're using this long term.

Dr. Jason Barnes:

I know that ototoxicity is one of the main considerations in treatment, can you tell us which of these medications you think about most often or more frequently in terms of being ototoxic?



Dr. Brian Neff:

I think is a great question and I would make it easier to remember by flipping it on its head what is approved for the middle ear and is not ototoxic and the list is short. It's ciprodex and Cipro HC, so any of the ofloxin. So any of the fluoroquinolone drops are the only ones that are approved. Everything else on the list whether it be acetic acid, definitely alcohol, boric acid, amphotericin, voriconazole, lotrimin, gentian violet, go down the list are not approved for the middle ear potentially of ototoxicity. There's a few that I have some clinical insight into that may not be I think that clotrimazole/lotrimin or voriconazole I've clinically used with an open middle ear without significant problems with... I think you do take a small risk because they're not cleared for the middle ear. I've used 10% betadine quite frequently with an open middle ear.

There are animal studies that go both ways whether yes it is or no it's not ototoxic. But in the clinical realm there have been studies saying that betadine does not cause any apparent ototoxicity. So I think that, that potentially could be okay. The steroids solutions when you're getting into the chronic eczema of the ear canals, the straight steroids are safe but when you're mixing them with things like tacrolimus or other medications, those medicines are not approved for the middle ear. So we really have a great need for more non-ototoxic topical therapies.

Dr. Jason Barnes:

And what's the role of powders? I think especially as it pertains to caring for a mastoid cavity.

Dr. Brian Neff:

The creams and powders are used by some physicians, and I'm not against them. I think the reason I don't use them primarily for patients just for standard ear canals and otitis externa... chronic otitis externa, is it's an access problem. You can very easily get cream down in an ear canal at home or powder down or in an ear canal at home. So, if you have a very compliance patient that's easily instructed those can be used, but I don't have a lot of success with that. Whereas a mastoid cavity with a meatoplasty that's wide I really do like powders and rinses. So I primarily use two powders in mastoid cavities, PVH powder which is a mixture of poly mix and B boric acid and hydrocortisone, or CSFH powder which is a mixture of chloramphenicol, sulfanilamide, amphotericin B, plus or minus hydrocortisone and these can be used once or twice a day.

One of the things I see with powders however is that over time used chronically just left on autopilot some patients do great with that other patients will build up these huge medical concretions of dried powder. So in those patients you got to probably be a little bit more limited in your use or to clean that stuff out periodically. And then I also like topical therapy for patients that have just this unknown granulation tissue or mucosalization in the mastoid cavity. I like using acetylcysteine with ciprodex. The theory behind how that works is that a lot of the bacteria such as Pseudomonas produce biofilms and the reason that they're not clearing with just ciprodex alone is just it's not getting penetration through that. So the acetylcysteine has been shown in lab laboratory studies to break down biofilm and then the ciprodex can then be more effective. So I've had some people use that with remarkable drying results of their mastoid cavity.

Dr. Jason Barnes:

What's the role for IV or oral antibiotics and when do you involve infectious disease colleagues?

Dr. Brian Neff:

Standard acute otitis media and chronic otitis externa do not... There is not a role for oral or IV antibiotics. To me it really is used for the patient that I think has developing or advanced skull base osteomyelitis. And then I think if you think you have that, I use IV antibiotics and my ID colleagues. I see a lot of people that are initially treated with oral fluoroquinolones when a patient has skull base osteomyelitis, and I think that is under treatment and it's not correct. So I do think that once you have your diagnosis and you're treating... treat with IV antibiotics I like to have patients treated with two antipseudomonas IV antibiotics for a minimum of six weeks, but typically until there's clinical symptom resolution or scan resolution, however you're following it so it may need to be much longer.

I think where the role of oral therapy comes in with skull base osteomyelitis is there are a non insignificant number of patients that you treat for skull base osteomyelitis to clinical resolution or scan resolution that then quickly rebound with a second case, and they may need to be on prophylactic suppression with ciprofloxacin orally. So that's where I see the oral therapy coming into play or being useful.

Dr. Jason Barnes:

Finally, what's the role for surgery in these patients more specifically with chronic otitis externa?

Dr. Brian Neff:

Chronic otitis externa is typically a medical disease. Where I see the mistake is, it's sucked in as a primary surgically disease and it's not. It's a medical disease that actually has a lot of hard work with cleaning and debriding that's necessary for... and a lot of trial and error trying to find out something that's effective. I think there are a small number of areas that can be considered for surgery, chronic otitis externa that causes a severe stenosis that's led to a conductive hearing loss and or trapping of debris medial to the stenosis, you can consider a canalplasty with split thickness skin graft. But I think that those types of surgeries do have a significant failure rate over time due to the fact that we don't have control of the primary underlying skin disease. So I'm very conservative with that. Secondly, myringitis is often refractory to anything that you throw at topical steroids, ciprodex, etc.

I offer laser myringoplasty, where you essentially use a defocus laser of choice and get rid of all of the granulations in the epithelial layer of the drum trying to preserve the middle fibrous layer and the under layer, and then you hope that a healthy squamous outer layer will regrow in place. I've had about a 50% success rate with that but it's not surprising when that doesn't work.

Then there can be surgeries used for patients that have medial canal fibrosis. I think you have to be careful about what has caused that and what stage of the disease that they're in. So typically, there's a transition from a wet myringitis acute inflamed red stage to a more fibrotic stage operating in the more inflamed stage I think is doomed to failure. So it really needs to be medial canal fibrosis in the dry fibrotic plugs stage of the disease, which is usually a couple years in. You can consider canalplasty split the skin graft and a lot of times you have to do a lateral graft tympanoplasty with that, to reset the drum back down to the annulus. Again, I think there's a high failure rate. I don't push those surgeries too much. I think a lot of times those patients can do quite well with a hearing aids or BAHAs and or things like that, so-

Dr. Jason Barnes:

Finally, can you tell us about the outcomes and prognosis for these conditions, maybe starting with acute otitis externa.

Dr. Brian Neff:

Acute otitis externa I think has an excellent prognosis. I don't think we see too much of it and ENT because it responds so well to therapy. I think a lot of primary care pediatrics, emergency room positions take care of 90 plus percent of it, so we don't even see it. And then I think we do see some that's more treatment refractory and most of those, I can get better too. So I think it's excellent. As you go to subacute and chronic, I think that the prognosis of getting back to normal and carefree never have to think about my ear again, becomes much lower. These tend to be refractory that even if I have a fungal otitis externa for example, that I get them over the acute exacerbation of it that they tend to come back and I see these patients long term with relapsing and remitting fungal infections. The atopic eczematous otitis externa, I think has the worst prognosis of them all because we don't have a dermatologic cure for eczema. So these patients are controlled but never really cured. The steroids and the tacrolimus, etc. do help quite a bit in the cleaning and everything else you've thrown at it, but they typically never really have a period of resolution and it's a chronic disease.

Dr. Jason Barnes:

Well, Dr. Neff, I think we've had a thorough discussion about otitis externa. Anything else you'd like to add before I move on to the summary?

Dr. Brian Neff:

I can't think of anything specifically other than to say that otitis externa acute, chronic or malignant is a lot of hard work. I think you have to really to debride and stay on top of a multiple follow ups and that's why it's not a very popular disease among the otolaryngologists, but I think if you do the hard work and put that in with the patient they tend to really appreciate it and some of them do get better.

Dr. Jason Barnes:

Awesome. Thank you so much. So to move into our summary, external ear infection can include a myriad of pathologies including acute otitis externa, chronic otitis externa and malignant otitis externa. Acute is often bacterial in nature and has a rapid onset and lasts for less than a few weeks. Chronic otitis externa lasts longer than three months, and it's more likely to be fungal in nature. Malignant otitis externa or skull base osteomyelitis is a progressive infection that travels from the external auditory canal through the foramen of the external auditory canal and into the skull base. Clinical exam includes a thorough exam of the canals and debridement for full appreciation of the clinical pathology, and workup can include culture if the ear is draining or refractory to treatment. Imaging can be indicated when there's possibility of osteomyelitis and biopsy is warranted when there's evidence of a mass or granulation tissue. In terms of infection there are a myriad of treatment options including antibiotics, antiseptics, acidification, antifungals, topical steroids and other powders. There are also roles for oral and IV treatment when osteomyelitis is in play as Dr. Neff described.

Operative intervention is pretty limited here but can include canalplasty or laser ablation if there's a myringitis and outcomes for acute otitis externa are excellent, while outcomes for chronic otitis externa are less encouraging, with this often being an issue that needs to be addressed for an extended period of time. Dr. Neff, anything you'd like to add?

Dr. Brian Neff:

No, I think that's it In a Nutshell.

Dr. Jason Barnes:

Great. We'll now move on to the question asking portion of our time together. As a reminder I'll ask a question, pause for a few seconds and then give you the answer. So the first question is, what are some common complaints or symptoms of chronic otitis externa? So common complaints or symptoms of chronic otitis externa are otorrhea, oral fullness, pruritus and varying occlusion of the extra auditory canal with possible hearing loss, and as Dr. Neff described pain is not usually as common in the chronic process as it is in the acute process. For our next question, what is the pathophysiology of otitis externa? Otitis externa is usually caused by a breakdown of the skin cerumen barrier, so this can be caused by trauma with things such as Q-tips or bobby pins or other predisposing factors like chronic water exposure, heat, humidity or the absence of cerumen. This leads to swelling and edema as well as breakdown in skin migration and the change in pH. This leads to a cycle of subsequent occlusion of dermal subunits and inflammatory reaction with bacterial or fungal overgrowth and progressive edema.

For our next question, what's the pathognomonic sign of malignant otitis externa? The sign that's most consistent with skull base osteomyelitis or malignant otitis externa is granulation tissue at the inferior aspect of the ear canal, specifically at the bony cartilaginous junction though is Dr. Neff said there can be granulation tissue all throughout the external auditory canal in these instances. And for our final question, what is the standard treatment for otitis externa? So the standard treatment of otitis externa both acute and chronic would be debridement to get a better understanding, to clear out any skin tissue and then placement of a wick if there's been stenosis of greater than 50%. Then it requires selection of appropriate topical with consideration of what may or may not be applicable in these scenarios, this includes antibiotics such as ciprofloxacin, acidification such as acetic acid, antifungals, antiseptic such as betadine and gentian violet and other topical steroids. Thanks so much, and we'll see you next time.