

Dr. Ashley Nassiri:

Hello, welcome to ENT in a Nutshell, my name is Ashley Nassiri, and today we are here with Dr. Gaelyn Garrett to discuss professional voice, Dr. Garrett, thank you so much for being here.

Dr. Gaelyn Garrett:

Well, it's a great pleasure to be here, thank you for having me, Ashley.

Dr. Ashley Nassiri:

Before we start with the typical presentations, could you speak to some of the characteristics of this patient population and some of the unique pressures that they face?

Dr. Gaelyn Garrett:

So, being here in Nashville, of course, we think of country music, Nashville is Music City, USA, but actually, we have all kinds of musicians here. We have what you would consider professional performers, the names that you might recognize, but we also have symphony chorus members, we have gospel, rap. I mean, you name it, we have all of these folks here.

Dr. Ashley Nassiri:

As far as the kinds of management decisions that you have to make when you work with professional singers and those who use their voice for their work on a daily basis, are there specific issues that come across such as their schedules that can be challenging to work around?

Dr. Gaelyn Garrett:

Definitely schedules are a major problem and interestingly for some of these people, the professional voice users, again, we think of their main career being their singing voice, but a lot of these people also have side jobs, and these side jobs are where they might even make more of their money. Now, the big name, obviously, they don't do that, but some of these people who are early in their career, they might work at a bar, or they might work as a restaurant using their speaking voice. So the pressures or trying to make money but also save their voice for their true love and their true passion, which is their singing is definitely an issue for them.

Dr. Ashley Nassiri:

So, what are some of the most common reasons that professional singers present to your clinic?

Dr. Gaelyn Garrett:

The main reason obviously, is them noticing a difference in their voice, and when I see a patient for the first time I always ask them what is different about their voice because generally once you walk in the room, you're hearing their voice quality and you're already starting to make some assessments in your own mind about how they sound. But what you hear and think might be abnormal is not for them sometimes, so I ask them what is different about their voice and what is it that they're hoping that we can help them with? So that's the number one thing, and of course, we want them to quantify and qualify what is different, whether it's the sound, whether it's the range, the pitch, fatigue, pain. There are lots of different things that is troubling for them.

Dr. Ashley Nassiri:

So, you mentioned some of these already, but what are some of the other specific questions that you ask related to vocal health to help assess the risk factors that the patients you see have?

Dr. Gaelyn Garrett:

So, I want to know of course with the actual symptom that they're presenting with, I want them to further characterize that, how long has it been going on? Are we talking about an acute problem versus a chronic problem? Do they have underlying chronic problems and then have an acute exacerbation? So, a lot of different things that we could go into great detail about the voice itself, but other than that, I also want to know what are their voice demands? Are they using the voice more than they have used in the past? For the new artists and the new people who've just recently signed with a label, I'm asking them are they being asked to do more than they've done in the past? Are they performing more? How many days a week are they performing? We have a lot of song-writers here in Nashville, so the songwriters don't always think of their songwriting as part of their singing time, and so you want to know are they also spending time songwriting because that can be an additional stress.

Dr. Gaelyn Garrett:

I ask about the activities apart from their singing, do they work out? If they're working out, do they do aerobic activity or are they doing weightlifting? Different types of exercising that can put strain on muscles, and all the other typical things that you would ask in a routine Ear Nose and Throat presentation, allergies, reflux, how much water are they drinking, caffeine, et cetera.

Dr. Ashley Nassiri:

Since there doesn't seem to be a perfect way to objectively evaluate dysphonia, what is the best way, in your opinion?

Dr. Gaelyn Garrett:

So, I think that you have to look at quality of life measures, patient-reported outcome measures et cetera, and there are various ones out there. None of them are perfect, but I think the important thing is to be consistent, there are different scales, the GRBAS scale, people pronounce that various ways, the CAPE-V scale, and of course, the voice handicap index and its variations. There's actually a short-form, which is a VHI-10, and there's actually a singing VHI, which you can use for this particular population. But whatever one you use, be consistent, and I know a lot of different voice clinics have their own measures that they use.

Dr. Ashley Nassiri:

So, what are some of the other perceptual voice abnormalities that we should be familiar with?

Dr. Gaelyn Garrett:

So, again, the first things that I typically think about are roughness, strain, we see a ton of muscle tension dysphonia, so a vocal fry, where they're talking down in this kind of voice. Some of our professional voice users, you might hear pitch abnormalities and you think about diplophonia where they're actually producing more than one frequency of vibration at the same time. It's not diplophonia the entire time, some people might call it a pitch break every now and then, a lot of the singers will also complain about the transition in their voice, going from their chest voice to their head voice. A classically trained singer will describe that as their *passaggio*, and that can be due to a number of different things, but those are some of the type of things. You can also listen for changes in breathing, stridor where it's a

[inaudible 00:06:44], and we typically hear more inspiratory, which is what I just demonstrated. Probably not so much in this patient population, other things, just in general, tremor, where the voice is up and down like this.

Dr. Gaelyn Garrett:

Where it's very rhythmic as opposed to someone who has a dystonia such as adductor spasmodic dysphonia where they break on voices sounds, Adam eats apples and eggs, where there's a break but it's not necessarily consistent, it's more depending on what sound they're producing. So there's a lot of perceptual worth that you can glean just from your initial interview with the patient before you even look at the larynx.

Dr. Ashley Nassiri:

Great, so after we get a little bit of history, of course, the next step is a head and neck exam, what specifically are you looking for in these patients?

Dr. Gaelyn Garrett:

Again, consistency is a very good thing to do because otherwise, you tend to focus on what you think is going to be abnormal, and I think that that's true for any of the patients that we see in otolaryngology. But I do a routine head and neck exam, so the first part of my career, I was doing a lot of general otolaryngology, so I think that makes me, in my opinion, a better laryngologist because anything going on in the nose or the nasal pharynx can affect what's going on in the larynx area. So, I'm looking for mucus membrane quality, is it dry? Is the mucus itself thick and sticky and gooey which might imply dehydration from whatever reason? We're looking at the neck, it's a very focused exam for us, specifically, I'm looking for pain on palpation on the anterior neck, we're palpating the strap muscles, we're palpating the thyrohyoid space. Palpating the thyroid cartilage itself because most people are not that tender in those areas, and you can try it on yourself to test it.

Dr. Gaelyn Garrett:

But someone who engages those extra laryngeal muscles will be markedly tender when you palpate there, so that's a dead giveaway for either primary or secondary muscle tension.

Dr. Ashley Nassiri:

So after your full head and neck exam, what's your next step in the workup?

Dr. Gaelyn Garrett:

So, obviously, at some point we want to actually look at the larynx, looking at the larynx, three standard ways of doing that, I think the first way is with a dental mirror, that's a lost art and I'll be the first to admit that it's a skill that I never really honed in. But for those who do that, but there's no question that a mirror is going to give you the closest natural color, the least amount of distortion, so if you're good with a dental mirror and headlight or head mirror, that's the way to do it. We then have the option of doing flexible transnasal laryngoscopy or we have transoral rigid endoscopy with angles telescopes, typically a 70-degree or 90-degree scope. Depending on what you're looking for, there are patient-specific factors, and there are what you potentially might think are diagnosis consistent factors that would dictate, "Am I going to use transnasal, or am I going to use transoral?"

Dr. Ashley Nassiri:

So, what is stroboscopy and how is this different than a normal nasopharyngeal fiber-optic examination?

Dr. Gaelyn Garrett:

I think that's a great question because I think that those terms are frequently used interchangeably in error, flexible laryngoscopy or rigid laryngoscopy is just using a scope to look at the larynx, and it's usually using just standard light, whether it be halogen light, LED light, natural light. When you add stroboscopy, stroboscopy is really only determining how you apply the light to your exam and the stroboscopic light which synchronizes to your voice frequency, it's actually slightly offset from your voice frequency, but it allows for a perceptual slow-motion view of vocal fold vibration. So, I mean, that is really the only thing that stroboscopy adds, so if you're concerned about vocal fold anatomy and vocal fold mucosal wave characteristics, you need to do stroboscopy. That, by the way, can be done with either a flexible scope or a rigid scope, so yeah, just make sure that you know the difference between those two.

Dr. Ashley Nassiri:

When do you prefer to use a rigid versus a flexible scope exam?

Dr. Gaelyn Garrett:

So my opinion, the rigid exams, given the current technology, the rigid exams, I think, give the best optical view of the vocal folds themselves. They are typically bigger scopes from a diameter standpoint which allows them to take in more light, even with the distal chip camera scopes that are available for the flexible laryngoscopes, at least in my opinion, and people can differ there, but I think that the optics are much better with a rigid scope. Now, that's not to say that the flexible scopes are not good because they are definitely good, they're a huge improvement over the old fiber-optic scopes that we used early on. But flexible scopes are best if I'm looking at the big picture if I'm looking for any motion abnormalities if I'm looking at the airway. The rigid scopes, if I can do a rigid scope for a patient that I'm concerned about true vocal fold anatomy, then I would prefer to do that. Now, patient tolerance is the last determining factor and there's just a lot of people that just can't tolerate a transoral exam, and so the flexible scopes are not a bad second choice for those people.

Dr. Ashley Nassiri:

You mentioned evaluating the mucosal wave during stroboscopy, can you define that and tell us exactly what we should be looking for?

Dr. Gaelyn Garrett:

So, mucosal wave has to do with the traveling wave that occurs relative to the lamina propria of the vocal fold, over the muscle, the thyroarytenoid, or the vocalis muscle, and you can't really understand that until you understand the three-dimensional anatomy of the vocal fold. You hear laryngologists, we use the term vocal fold rather than vocal chord because again, it implies, it truly is a fold as opposed to a band of tissue that might vibrate. But mucosal wave is where you get that mucosal cover, which the epithelium and the superficial layers of the lamina propria will slide over the deeper layers of the lamina propria and the muscle. We use the term glottal cycle to define that mucosal vibration, and in discussion the glottal cycle, again, if you look at it in a coronal plane, if we were able to see vibration in a coronal plane, unfortunately, we can't, but if you could, thinking three-dimensionally, in the glottal cycle you're going to have a closed phase. That can either be when the lower lip touches, which is the inferior margin of the true vocal fold, or when the upper lip touches, which is the superior aspect of it.

Dr. Gaelyn Garrett:

The open phase is when the two edges are not actually touching while they're in an adducted position vibrating, so if I see a patient, for instance, if I look at the strob exam and I see a lesion on the lower lip, and it's usually unilateral, you can almost guess, and I'll ask the patient, I'll say, "Do you tend to drive your chest voice higher than you should before flipping into your head voice?" Because that will increase the glottal pressure on that lower lip area, and usually there will be this sign of, "Oh, you're right, how did you know I do that?" Because most people, especially the non-trained singers, a lot of these country singers, they don't like their head voice because it's a less powerful voice. So they will drive their chest voice high, and so that's something that we want to help them to recognize that they are causing surface damage to the vocal folds by using that voice technique.

Dr. Ashley Nassiri:

Next, we usually go into pathophysiology, but since we're talking about multiple ideologies, I figured we could go through each one systematically for some of the most common diagnoses, these include vocal fold granulomas, polyps, cysts, nodules, hemorrhage, and muscle tension dysphonia. We can start with vocal fold polyps first, can you tell us a little bit about these?

Dr. Gaelyn Garrett:

Yeah, so the nomenclature of these lesions, it's not controversial so to speak, but it's highly varied, shall we say. I think the term polyp is probably the most variably used term to describe these phonotraumatic lesions. Some people don't like to use the term polyp, some people have come up with terms, fibrous mass, pseudo-cyst, podule, I mean, there are various things that people have used. I tend to use the term polyp, but I usually will use a clarifying term along with it, so for instance, a person who comes in and they have a blood vessel associated with it, and you'll see a vascular change to it, that's a vascular polyp. Oftentimes, you can actually see the feeding vessel that goes into that polyp, I've had patients where I have actually followed the evolution of a prominent blood vessel, where it tends to form maybe a little ectatic lesion on the edge, and then over time because they're not compliant, for instance, with their behavioral changes, you'll see it all of a sudden turn into a true polyp with blood vessels associated with it.

Dr. Gaelyn Garrett:

Probably more commonly we see these translucent polyps that almost look like little blisters on the edge, and those are the ones that have been termed fibrous masses by some laryngologists. But again, I think it's the descriptor that's more important than the label, unfortunately, the ICD-10 codes drive us to naming these lesions that they're not really, but you have to pick something and you don't want to pick a non-specific term if you can help it. But the fibrous mass lesions, the translucent ones are the ones that I think more likely are going to respond to therapy and behavioral changes. The vascular polyps can respond and they can get smaller with behavioral changes, but they are more likely to end up requiring surgery.

Dr. Ashley Nassiri:

Approximately what percentage of vocal fold lesions do vocal fold polyps represent?

Dr. Gaelyn Garrett:

I think in my practice, they're around 30-40% again because they are varied in their appearance, so that's probably a good estimate.

Dr. Ashley Nassiri:

Can you tell us a little bit more about vocal fold nodules?

Dr. Gaelyn Garrett:

Sure, so vocal fold nodules are generally bilateral lesions that occur in that striking zone, and interestingly, really all of the phonotraumatic lesions that you mentioned they all really occur in the same location on the membranous vocal folds. If you want to be specific, it's usually the junction of the anterior and middle thirds of the membranous vocal folds. So nodules are, I used the term callous with the patients, but again remember, it's not the epithelium that's abnormal, but that to me kind of helps the person to understand what I'm actually talking about. So, the idea is that if you've got too much friction in this one area and you're not protecting it, then you get a little focused inflammatory response and for whatever reason, and we don't know why somebody might develop nodules as opposed to a polyp or cyst. But you get a thickening to the basement membrane zone, some of the work that Mark Courey did years ago where he actually looked immunohistochemically at these various lesions shows that nodules were just thickening of the basement membrane.

Dr. Gaelyn Garrett:

The good news is that for those particular lesions, they generally will go away if you change or alter the offending behavior, just like a callous would. So, that's kind of how I use the analogy to help our patients understand.

Dr. Ashley Nassiri:

Our third diagnosis is vocal fold hemorrhage, can you tell us a little bit this?

Dr. Gaelyn Garrett:

So, vocal fold hemorrhage or just bleed, which is what your patients will come in, I will tell you, that is one of the most fearful diagnosis for a singer to hear. They'll come in and they'll say, "Oh, please tell me I don't have a bleed in or on my vocal chord." So to speak, they probably occur more often than we see, anybody that has used their voice professionally for a long, long time, especially if they haven't had good voice training, they're going to put stress and strain on the mucosa and we will see a lot of neovascularization. When you do an exam and you start seeing the blood vessels, these tiny, little curlicue blood vessels that travel across the surface of the vocal fold heading to that medial vibrating edge, that's neovascularization, that is not normal blood vessel appearance. Again, it kind of goes back to our discussion about vascular polyps, that is probably the ideology of a lot of the vascular polyps that we see.

Dr. Gaelyn Garrett:

But these new blood vessels are fragile, they're not as hearty, they don't have the same structure as those we were born with, so to speak, and if they have a little micro-rupture of tear, usually it's within the mucosa as opposed to on the surface. You're going to see blood tracking within the superficial layer of the lamina propria, and that's a frightening thing for a singer to see. The good news is the majority of hemorrhages resolve, we don't see probably a good percentage of these hemorrhages, they probably occur and we never know it, and in most cases, it probably doesn't have any permanent issues. But if you see one, you do worry about the inflammatory response associated with the bleed, and so we generally will put people on some degree of voice rest for a period of time until that hemorrhage has resolved just to reduce the trauma while they're in an inflammatory phase.

Dr. Ashley Nassiri:

Can you describe a little bit about how these patients present, and how you determine how long they may need voice rest?

Dr. Gaelyn Garrett:

So the ones that actually present are the ones that generally will have noticed a relatively sudden change in their voice. You might see a singer who comes in and says, "Gosh, I was in a set last night and I was doing great and all of a sudden in the middle of the set, I felt a change in my voice and I tried to do some throat clearing, I drank water and it just wasn't there." Oftentimes though, the singer will tell you they felt something, and then they can feel a change in their voice but yet you ask somebody in the audience and they may not have noticed that same change. But the singer knows it, and so that might be an indication that they've had a hemorrhage, we've had some where they've made it through the show and they said that everything was fine but they wake up the next morning and they don't have a voice. So it can be variable, we've seen people who come in even just for routine followup, we've just been following their exam over time and they come in and you look at their vocal folds, you'll see that typical yellowish discoloration on the affected side and you say, "Well, anything happen? Did you notice any issue with your voice several days ago?"

Dr. Gaelyn Garrett:

Oftentimes, they can tell us something but sometimes they're like, "No, I haven't noticed any problem with my voice." So again, it's hard to tell somebody to shut down when the bleed happened days ago or even a week or more ago. Now, if I see a patient coming in and they clearly have had an acute hemorrhage, something within the last 24 hours or so, then I do feel an obligation to shut that person down. So our general recommendation is complete voice rest, so speaking voice and singing voice, generally for a week, and that's during the time that you're going to see the blood resolve and be resorbed. Some of that is related to your own clinic time, but I think a week kind of matched up well with the resolution of the hemorrhage. You certainly don't want to risk having it re-bleed during that time and increase the inflammatory response, some people will add steroids during that time. I don't think there's any direct evidence, I think sometimes a steroid, it may make the physician feel better, and it may make the singer feel better. But there is also some concern that steroids may actually delay the healing and actually may potentiate a bleed.

Dr. Gaelyn Garrett:

So, my own practice, I generally don't use steroids unless I see some really significant surrounding inflammation, but I'll bring the patient back usually at that one week or so mark and just see how it's doing, is it resolving? Of course, at that time you also have to be wary that if it happens once, it can happen again, so you look to see if there's an obvious ectatic vessel that might be the culprit. But a lot of patients may have a single bleed and never bleed again, so I don't think a single bleed is an indication to take them to the operating room. Repetitive bleeds, definitely, but I will tell them if they are a singer, I would not want them going back to performing within that one week, generally, I would give them two to three weeks and not let them go until you see them and it looks pretty much close to normal.

Dr. Ashley Nassiri:

Can you tell us a little bit about vocal fold cysts?

Dr. Gaelyn Garrett:

Yes, so vocal fold cysts, again, that's probably more accurately my pea in a pod description, and generally, with cysts, they appear deeper. I mean, when you look at them, you're not seeing them generally extend from the medial edge, you're seeing them within the substance when you look on stroboscopy. Cysts are more likely to alter mucosal wave, so you'll look down and if you actually see, because generally you can potentially see the cyst outline within the substance of the vocal fold, and depending on its size and how long it's been there, the mucosal wave will just be absent at that location. That sometimes can actually be a hint, if you're not seeing the outline of the cyst, but you see this little focal area of adynamic vibration, it might tell you that there's something under the surface there in the SLP, but again, they occur within the superficial lamina propria. As far as how does a cyst form and why does it form? It's an area of study, it's thought possibly that someone might have a sulcus there, and you get a little involuted mucosal cover epithelium and it gets trapped and just over time it just started developing desquamated debris in there.

Dr. Gaelyn Garrett:

We've used the term the vocal fold cholesteatoma, so that is one school of thought. Another school of thought is that you just get a little superficial tear in the mucosal cover and that causes some entrapment of debris in there. There are little glands that are infraglottic, there are not any glands within the vibrating portion, but possibly due to constant trauma, you can have one of those glands start making its way because of injury and inflammation, into that area. But the bottom line with a cyst, you're less likely to avoid surgery, now again, never say never because I've had some prominent singers who come in and there is a big cyst there and they're not ready for surgery, the timing is not right and they are able to perform with that cyst present and I've seen them in followup and there's no indication. Maybe the cyst decompresses, the capsule becomes fibrotic and never causes a problem again.

Dr. Gaelyn Garrett:

But, if you're going to look at the percentage of lesions requiring surgery, cysts are most likely than not to require surgery, and you need to make sure you're removing the capsule when you address cysts.

Dr. Ashley Nassiri:

So, next, we'll discuss vocal process granulomas, can you tell us a little bit about these?

Dr. Gaelyn Garrett:

So vocal process granulomas probably aren't considered a phonotraumatic lesion, although I guess in some cases they are, but it's usually more related to speaking voice trauma. Again, vocal process granulomas, I want to differentiate that from intubation granulomas because the pathophysiology is very different. But these non-direct trauma-related granulomas are more than likely associated with some superficial trauma to the vocal process mucosa where you might get a little perichondritis with it, and it's essentially an ulcer that has an inflammatory reaction and they can vary from a little flat ulceration to a very large granuloma. Sometimes you'll even see a cup and saucer appearance where the contralateral vocal process will actually be seen the fit into the cup shape of the granuloma on the ipsilateral side. But these generally are not on the membranous vocal fold and a lot of people with granulomas will not even report a voice change.

Dr. Gaelyn Garrett:

If they do have a voice change, often it's the voice change that led to the granuloma as opposed to the granuloma leading to the voice change.



Dr. Ashley Nassiri:

Are there any other disease processes that are associated with these granulomas?

Dr. Gaelyn Garrett:

So, if you look in the literature, you're going to see reflux associated a lot of the time, and I think there's no doubt that if someone does have acid or non-acid abnormally coming up into the hypopharynx and in the laryngeal area, then it absolutely can be an aggravator and a potentiator of granulomas. But I think again if you look at the literature, it is a little bit disparate as far as good science that says, "Yes, granulomas are due to reflux." They may be associated with reflux, but certainly, I think most laryngologists have seen patients who've had negative pH probe testing, negative GI evaluation across the board, negative impedance, and also they get better without addressing any type of reflux treatment. If you want to treat empirically, I think there's little harm but I don't think that reflux, in my opinion, is the primary factor associated with it.

Dr. Ashley Nassiri:

So finally, can you tell us about muscle tension dysphonia and how this affects professional singers?

Dr. Gaelyn Garrett:

So, muscle tension dysphonia is one of the most common issues that we see, not only in professional singers but really in any of our voice patients. I think it's probably underdiagnosed in the general otolaryngology community, but I think you have to think about MTD as either primary or secondary. Primary MTD can occur with a lesion or with an anatomical abnormality of the vocal folds or without an anatomical abnormality, the vocal fry that I demonstrated earlier, that's essentially a version of MTD. Oftentimes you'll hear that right away, and you'll hear it with the speaking voice generally speaking, and you may have a person that comes in and they're classically trained in their singing voice, they have a voice coach and they do everything well with their singing voice. Yet, when they start using the voice that they use 95% of the time, they're using bad behaviors, they're engaging the strap muscles, they're engaging the tongue base, even the palate can have tension.

Dr. Gaelyn Garrett:

So, you want to make sure that you're examining the neck, examining the posterior neck, the trapezius muscles because again, oftentimes that's where the tension is originating and it's just carrying over to the paralaryngeal muscles. We have a great relationship with our physical therapist at Vanderbilt and even actually in the surrounding communities, we send patients to physical therapy, I mean honestly, several times a day and that has been a game-changer, especially for our professional voice population. The ones who are musicians where they're playing an instrument, they're playing a guitar or they're playing a keyboard where they're carrying a lot of upper body tension during those times. So, secondary MTD is related to potentially a phonotraumatic lesion, they're trying to overcompensate for the fact that their vibration is affected by a nodule or a polyp, et cetera. But regardless of the type of MTD, I want to address that before I do anything or think about anything surgically. So, I'm probably referring to physical therapy as often as I'm referring to our speech pathologist.

Dr. Ashley Nassiri:

So those are some of the more specific diagnoses found in professional singers, but what are some of the other diagnoses that remain differential for dysphonia?

Dr. Gaelyn Garrett:

So that's a long list and again, I think it's good to think about again whether it's dysphonia that directly due to a change or alteration in laryngeal mechanics, vocal fold abnormalities versus other anatomic areas. If it's affecting the vocal folds themselves, we don't see infectious laryngitis a lot, but it's certainly something to think about, we do see inflammatory laryngitis that's non-infectious. We see autoimmune disorders can actually affect the vocal folds themselves, it can affect the joints of the vocal folds, you could go through your typical differential for any set of symptoms. There's neurologic abnormalities, paralysis, paresis, presbyphonia, if you think about the age of a patient, vocal fold atrophy. We talked earlier about spasmodic dysphonia and tremor as other neurologic disorders, so again, I think it's nice to think about it as primary laryngeal versus non-laryngeal where the larynx is kind of the innocent bystander from some other underlying diagnosis.

Dr. Ashley Nassiri:

So, we already talked a little bit about workup including a full head and neck exam and a nasopharyngeal examination, are there any other aspects of the workup that you might consider for these patients?

Dr. Gaelyn Garrett:

So I think for any voice practice, anyone that sees patients with voice abnormalities, you have to have partnership with speech-language pathology and we are very fortunate that ours are in-house. But you don't have to have them in-house, you can partner with someone in your community but I think you really cannot take care of voice patients without that added partnership. They not only help you with perceptual analysis of the patients but obviously, they help with the treatment of the behavioral aspects as an underlying cause. Acoustic analysis is probably not as helpful, we mentioned earlier about the lack of good objective measures of voice, depending on the abnormality, I mean, there's certainly other things that we have in our toolkit, laryngeal EMG for instance for any kind of neurologic voice disorder. But in my mind, I always ask what is this test going to impact in my decision making? Is it going to alter the options I have for management? And if it possibly can alter it, then I think it's indicated. If not, then I would just be more cost-effective and save the patient the aggravation.

Dr. Ashley Nassiri:

Is there any role for imaging in these patients?

Dr. Gaelyn Garrett:

Not generally, I think again, if there's any type of airway concern, I mean, I think it's also I think standard of care if you have a paralysis, paresis and you don't have an obvious cause, then yes, I think imaging is required. When you're talking any kind of neoplastic process, cancer, I think a lot of people now are not even getting imaging for T1 vocal fold cancers, so probably not doing that a lot.

Dr. Ashley Nassiri:

So, next, we'll talk about treatment options, what are the treatment options in general for dysphonic patients?

Dr. Gaelyn Garrett:

So, of course, it depends on the diagnosis and what you see on your exam and what you hear, but the biggest thing that I think drives my treatment recommendation is individual patient quality of life. I may have 10 patients come in with the exact same objective presentation, but yet, they all have different needs with their voices. So, treatment recommendations might differ from the professional voice person to the person who lives by themselves, has a job that doesn't require their voice, and they would rather just know that they don't have cancer and not of forward with any other treatment. So quality of life is number one and again, I think that's where the art of medicine comes in, you have to know your patients and establish that relationship. So generally speaking though, when I am talking about options, there's just observation, you don't have to do anything. You may have a voice user and you see a polyp or nodules and again, they're like, "My voice does everything I need it to do."

Dr. Gaelyn Garrett:

So we'll just observe it, even some professional singers have a visible phonotraumatic lesion, but yet because they have trained themselves and have had good behavioral modifications, their voices are as good as they've been with that lesion. So I think that's another good counseling point for your patients to know, kind of building up going from the observation to no-risk proactive interventions, voice therapy. Voice therapy with a speech-language pathologist who hopefully, has done some post-graduate work in voice, to me, I think that's imperative. I mentioned earlier about having that partnership, so voice therapy is no-risk, now, trying to convince a patient that voice therapy is going to be beneficial is sometimes challenging, and that's where that relationship building comings into play. I also think that's where, even if you're not in an academic institution, you have to educate your patients, tell them why they developed this lesion, or tell them why their voice is the way it is.

Dr. Gaelyn Garrett:

As long as they understand it, then they are more likely to agree to do something that you recommend such as voice therapy. Medical management for any associated underlying issues, you have to be careful about allergy medicine if you think allergies are playing a role. Some of the allergy medicines can actually be counterproductive to vocal health with their drying effects, a lot of the allergy practices love the antihistamine decongestant combos, and I try to have patients not go that route. I try to have them, if they need that antihistamine, take the antihistamine without the decongestant, but if they need the decongestant, they can take that as a separate pill. The nasal steroid sprays, big fan of those, I don't have any problem with a professional voice user using Fluticasone or equivalent nasal steroid sprays, especially if it allows them to get off some of the drying medications.

Dr. Gaelyn Garrett:

Then, of course, we're surgeons, so a surgical excision is an option if you get to the point where the patient's been compliant and they are not able to perform to the level that they need to perform. That is a discussion and again, it is a patient to patient variable but surgical excision is designed to try to get them back to their good vocal health. So if they're there with a lesion, then avoid the risk of surgery, but using techniques such as the microflap techniques have really been shown to provide either recovery or maintain vocal fold vibration. So, surgery is the right option in a good number of these patients.

Dr. Ashley Nassiri:

So before we get into the details of surgical interventions, can you tell us a little bit more detail about what voice therapy entails?

Dr. Gaelyn Garrett:

So there are different types of voice therapy, and I try not to try to influence them too much because just like as a surgeon, I may do something a little bit differently than my colleagues who may have even trained here at Vanderbilt with us. So, you do what works best in your hands, and so the speech-language pathologist hopefully has their set of tools in the toolbox, and that's also key because some patients may respond to one type of voice therapy, and not another. I've actually had patients who had to switch speech pathologists because there was not that good connection there, and so the whole idea is to help the patient understand the behaviors that led to their current problem, so that's really the importance there.

Dr. Ashley Nassiri:

So, we discussed a little bit already about when we decide to operate on patients, if we do decide to operate, what techniques do you use for treatment of these lesions?

Dr. Gaelyn Garrett:

So, for these phonotraumatic lesions, and I'm going to specifically say polyps and cysts, we don't generally need to operate on nodules which are typically the bilateral symmetrical lesions because they respond generally to therapy and behavioral modification. But for cysts and polyps, these are lesions within the superficial layer of the lamina propria, the abnormality is generally not involving the epithelial layer or the mucosal cover. So, your surgery should therefore be aimed at that layer of the vocal fold, and as I explain it to my patients, I try to compare it to a pea in a pod concept, that I want to open up the pod, take out the pea and then close the pod so that all we're left with is an incision that has to heal. So, unlike that bad word that should be banned from the laryngology vocabulary which is stripping, now having said that, some of these lesions, especially some of the polyps, for instance, can be quite large and the overlying mucosal cover can be thin, it can be just a non-functional area.

Dr. Gaelyn Garrett:

So, in order to get that closure along the vibrating edge, you often do have to remove some of the epithelial layer or the mucosal cover. But you do that in a way so that once you excise that, you again, want to end up with that single incision with the edges coapted. If you can have the incision away from that medial edge, that's ideal, the so-called medial microflap approach versus the lateral microflap approach, I think the bottom line is, plan your incision so that you're thinking that single-incision line that has to heal. For cysts, I generally make my incisions a little bit more laterally because it allows me to have a better retraction within that pea in a pod so to speak. But for polyps, if you think you're going to have to remove some of the mucosal cover, you need to plan your initial incision so that the edges do coapt well.

Dr. Gaelyn Garrett:

So there's also a question of whether or not steroids are beneficial with this type of surgery, some people historically have used just steroid to layer into your incision area, some people actually are using steroids now to inject even without the excision part of it. That is being done both in the office and in the operating room where you inject the steroid directly into the lesion, which is essentially going into the SLP, and that is certainly an option. I don't think there's enough experience with that approach to say whether it's efficacious or if it's going to replace surgery, my guess is that it works in some people but not in everyone.

Dr. Ashley Nassiri:

So, let's discuss outcomes and expectations, if we proceed with surgery, how do you generally counsel patients on the complications of surgery and what to expect post-operatively?

Dr. Gaelyn Garrett:

So, as far as risks go, there are risks of the actual procedure itself, the physical doing the laryngoscopy and this is the typical, we're using a metal instrument that is going into the mouth, you have to get the tongue out of the way in order to get that line of sight view to the vocal folds. So any of the structures that are between the mouth and the vocal folds are at risk for injury, so we talk about injury or laceration of the lips, tooth injury, cracked tooth, loose tooth, chipped tooth, of course, our anesthesia colleagues are usually going to be telling them the same thing. I really do emphasize the tongue because if you don't tell them about the tongue, I've had more patients come back complaining about their tongue than anything else. So I always tell them that the tongue takes up a lot of space in the mouth, we have to get it out of the way, and generally with laryngoscopy, we're going down the right side of the tongue, not always, but I will tell them, "Do not be surprised if after you wake up, the side of your tongue, usually the right side, it might be painful, it might feel numb."

Dr. Gaelyn Garrett:

They might feel that their sense of taste is altered on that side, that can last a short time, a day or two, but I actually have seen it last for several weeks. There are even reports in the literature that it has lasted much longer than that, months and months. Fortunately, I have not seen that happen, but again, I think it's good to counsel the patients that that can occur, so that's just us putting our instruments in the mouth. For the actual surgery itself on the vocal folds, the big fear of any singer is scar, and so I get that out right at the beginning, and so I tell every patient, "I'm going to make an incision on your vocal fold, it has to heal and all incisions heal by forming scar." The big question though is how much scar, and what is the characteristic of that scar? And there are certainly patient variables that will impact that, some that we're not even aware of, so we focus on that term a lot. But what I do say is that the techniques that we use with the microflap technique, they are designed and have been shown to have the least risk of scar formation.

Dr. Gaelyn Garrett:

It doesn't eliminate it, but ideally, it's going to be a minimal scar that does not affect vibration, but again, that is a risk. If it heals by forming a very stiff, firm scar, then it is going to affect vibration and can cause a permanent effect on the voice.

Dr. Ashley Nassiri:

What do you generally recommend post-operatively for microflaps?

Dr. Gaelyn Garrett:

So, post-op I don't put them on any dietary restrictions generally, so I let them eat or drink anything that they can tolerate, although most patients will start with a soft diet just because of the mouth and throat discomfort. The fortunate thing, and I tell patients this, the vocal folds themselves really don't have a lot of pain sensation. So, any pain medication that is needed is generally to address the tongue and those surrounding areas, but most patients don't need prescription pain medicine. So that's one thing, I don't generally use antibiotics, I don't use them pre-operatively or post-operatively, probably the biggest question is voice rest and that's an area that's generated a lot of discussion in laryngology. It's generated

some research, some of that which was done by my former colleague, Dr. Bernie Rousseau, who's now up at Pittsburgh. But again, the idea with voice rest is to do whatever it takes to optimize healing.

Dr. Gaelyn Garrett:

We cannot put the vocal folds at complete rest, they are constantly moving, if you just put a scope and you just put a transnasal scope and you just watch the larynx with someone just sitting there breathing, those vocal folds are always moving and every time you swallow, every time you even gently throat clear, you're going to get contact with those vocal folds. So, voice rest, the idea there is just to try to eliminate the voluntary voice use as much as possible. I do tell my patients, I put them on complete voice rest, speaking voice rest, it usually ends up being about five or six days because I do see them back in-clinic the following week just to make sure that everything is healing as it should be. Most people are pretty compliant with that recommendation, and again, if you look at some of the science related to healing of the vocal folds, the incision is generally closed within two to three days and you certainly don't want vibration to occur to life that incision or make that incision wider than it needs to be.

Dr. Gaelyn Garrett:

But that same research shows that there are some positive healing factors that come into play with a little bit of movement, our orthopedic colleagues recognized that years ago as they have changed their post-op recommendations for hip surgery, knee surgery, et cetera. So some movement is good, but I do think that enough of that movement occurs with just non-verbal laryngeal function. So, generally, that's my recommendation, and then any followup that's done after that week is patient dependent. I'd like to get them back plugged into voice therapy as soon as I feel like the healing is adequate and most of the time, that's within two to four weeks of the surgery. For a performer, you have a singer who they're normally either going to go on tour, or they're going to be just doing even local sets, I tell them don't schedule anything that's really important for about three months. Now, in my mind, I know it might be sooner than that that they're ready to go, but at least you're not pushing back scheduled shows or tours.

Dr. Gaelyn Garrett:

They're very happy to get started sooner, but they're not happy if they have to postpone things even further than they planned, so three months is kind of my general time.

Dr. Ashley Nassiri:

What is the risk of recurrence of these lesions for patients who either undergo voice therapy or surgery, or both?

Dr. Gaelyn Garrett:

The recurrence rate fortunately is quite small, I think by the time that you get to the surgery recommendation, I think patients understand. They understand how they got to that point, and most of them now, I think singers and performers are much more educated now than they used to be. I think that management and labels are more understanding of the fact that this should be a long-term commitment and in years past, if you heard that a singer had nodules, oh my gosh, that might be a death knell for their career and they didn't want anyone to know that they had voice problems. With some of the very well known, prominent singers in the last decade who have come out and said, "Yes, I had voice problems, I had to have voice surgery." It happens, football players end up having knee injuries, singers end up having vocal fold problems, and occasionally need to have surgery, or at least

occasionally need to come off tour. So, I think people are much more educated and they're much more willing to think long-term than they are short term.

Dr. Ashley Nassiri:

Great, thank you, Dr. Garrett. At this point, I'll go ahead with a summary of our discussion. Professional singers present with specific career demands that impact health decision making, these factors include tour schedules, involvement of voice coaches, and managing short and long-term outcomes. Along with being at risk for normal pathologies, professional singers are at higher risk for voice overuse and misuse, developing problems with dysphonia cannot only be related to their singing voice but also their speaking voice and demands outside of their professional career. There are several vocal grading systems, however, there's no well-accepted objective measurements, most commonly, professional singers the dysphonia present with muscle tension dysphonia, vocal fold nodules, or vocal fold polyps. Less commonly, they may present with vocal fold granulomas, vocal fold hemorrhage, or vocal fold cysts, this is all in addition to the long list of diagnoses for dysphonia in non-singers including infection malignancy, vocal fold paresis or paralysis, and Reinke's edema, to name a few.

Dr. Ashley Nassiri:

Treatment of dysphonia in the professional singer is tailored to the diagnosis, but voice therapy almost always offers some benefit, even pre-operatively. In the case of vocal fold polyps or cysts that persist beyond voice therapy, surgical excision with a microflap technique may be beneficial. Long-term outcomes for treating dysphonia in professional singers is generally positive but heavily depends on patient participation with therapy. Thank you, Dr. Garrett, for reviewing professional voice with us, is there anything else you would like to add?

Dr. Gaelyn Garrett:

No, Ashley, I think you've covered it well, and this has been very enjoyable, thank you for having me.

Dr. Ashley Nassiri:

It's now time to bring this episode to a close, but before we do, I'll go through some questions, as always, I'll ask a question, wait a few seconds so you can think of an answer on your own, and then I'll give the answer. First question, what are some of the exacerbating factors that might impact voice quality? Some of the exacerbating factors that can impact voice quality include voice overuse, misuse, dehydration, caffeine or alcohol intake, smoking, gird, medications such as inhaled steroids, and Warfarin to name a few. Second question, what are some aspects of voice quality that we can evaluate subjectively in the clinic? Some of the subjective voice qualities that we can evaluate in-clinic include grade, roughness, breathiness, asthenia, strain, diplophonia, tremor, stridor, and vocal fry, to name a few. Third question, what data does rigid stroboscopy offer that a normal flexible non-stroboscopic examination does not?

Dr. Ashley Nassiri:

Rigid stroboscopy utilizes a strobe light to allow for examination of vocal fold vibration and closure, essentially in slow-motion, as a result, the mucosal wave and fine details of vocal fold motion are more easily examined for abnormalities. A flexible fiber-optic examination without strobe light can reveal disorders of vocal fold movement, the greater airway or vocal fold lesions, but typically does not pick up on the mucosal wave abnormalities which can be critical in professional singers. Last question, describe the microflap technique for removing vocal fold polyps. The microflap technique was designed to

minimize post-operative vocal fold scarring and associated dysphonia, direct laryngoscopy exposes the true vocal folds and the remainder of the larynx under microscopy. The epithelial layer overlying the lesion is sharply elevated in a flap configuration and reflected to reveal the lesion, the lesion is then directly excised from the superficial lamina propria layer.

Dr. Ashley Nassiri:

Once hemostasis is achieved, the epithelial layer is reflected back into position, preservation of the epithelial layer is thought to better preserve the mucosal wave, resulting in improved voice post-operatively. A microflap excision can be completed in conjunction with a direct steroid injection into the vocal fold at the time of surgery. Thanks again for listening and we'll see you next time in ENT in a Nutshell.