Dr. Deanna Menapace:

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Dr. Jason Barnes:

Hey, there, welcome to another episode of ENT, In a Nutshell, my name's Jason Barnes, and today we're joined by rhinologist and skull-base surgeon Dr. Katie Lees, and we will be discussing epistaxis. Dr. Lees, thanks so much for being here.

Dr. Katherine Lees:

Yeah, it's great to be here.

Dr. Jason Barnes:

So today we're discussing epistaxis, otherwise known as nosebleeds. And while we'll try to follow the typical format, we will deviate a bit just because this is a more symptomatic topic. Additionally, I'll add that there are recent clinical practice guidelines that have been published and we'll weave some of those recommendations into our time today. But Dr. Lees is just to start when we're talking about people with epistaxis, can you tell us a little bit about the epidemiology of these folks?

Dr. Katherine Lees:

Yeah. So epistaxis says an extremely common complaint among the general population. It's estimated about 60% of people will experience at least one nosebleed at some point in their life, so very common. Only about 6% of nosebleeds need any sort of medical intervention and only 0.1% actually require hospitalization, but it does account for over a million emergency room visits every year. The mean age is about 50 years old, but it's important to keep in mind that it's actually more of a bi-modal age distribution being most common in kids under 10 years old. And then again, more commonly in your seventies, eighties or higher, but it's about an equal distribution between males and females.

Dr. Jason Barnes:

And when folks present with epistaxis, what's a typical presentation that you see.

Dr. Katherine Lees:

So most commonly they're going to have bleeding from the nose most commonly out the front of the nose, but they can also have bleeding down the back of their throat. Typically it's able to be stopped just by application of pressure. Usually it's just on one side, but some people will experience it on both sides. And a majority of patients will have had nosebleeds in the past less commonly you'll have people come in with very severe profound bleeding from the nose or bleeding. That's not able to be stopped by pressure.

Dr. Jason Barnes:

And when you're evaluating these patients, can you walk us through some of your first steps, presumably this is usually in the emergency department, but wherever you encounter these patients, what are kind of your first steps and rules of thumb for evaluation and management?

Dr. Katherine Lees:

Yeah. So, with any complaint, you want to start with the ABC's and make sure that somebody is stable. So you want to determine how bad the nose bleed is to if they need to present more urgently. And that's things like concerns for airway compromise, particularly if they're having a lot of bleeding down their throat, or if they're having any sort of symptoms, suggestive of more severe blood loss, things like feeling weak, light-headed having palpitations or a fast heart rates are all important to rule out at first. And then you also want to question them about the episode of nosebleed itself. So you're more likely to want to evaluate somebody if they've been having a nose bleed for greater than 30 minutes without stopping if they've ever required hospitalization for a nosebleed in the past, if they've ever required a blood transfusion for a nosebleed, or they've recently had three or more nosebleeds, and those are people that in particular need medical evaluation.

Dr. Jason Barnes:

And when you're evaluating these patients, are there any other history type questions that you ask them, provided there's time to ask questions and take a history?

Dr. Katherine Lees:

Yeah. So there's certainly risk factors for having a nosebleed. And it's important to assess which, if any, of those the patient has. So if they've had any recent nasal or sinus surgery or trauma, that could be the precipitating factor, there's also some underlying comorbidities that are more common in nosebleeds. Things like high blood pressure patients that are chronically anti-coagulated such as with aspirin or warfarin, if they use any sort of nasal devices like nasal cannula, or CPAP use, you also want to ask about their current medications as well as recreational drug use, because use of those particularly in the nose can cause nosebleeds probably most commonly would be intra-nasal topical steroids, like Flonase, nosebleeds are quite common among those patients. And then of course, recreational drug use such as cocaine. And then finally you want to ask a little bit more about family history and personal history of bleeding disorders or epistaxis. And then specifically in children, you want to consider the possibility that there may be a foreign body in the nose that's causing the nose bleed.

Dr. Jason Barnes:

I feel like one question that comes up a lot is whether or not to perform nasal endoscopy. How do you decide when you're seeing these folks whether or not to scope them?

Dr. Katherine Lees:

Yeah, that's a great question. So in all patients you'll want to start with just anterior rhinoscopy using a good light source, like a headlight and a nasal speculum. The reason for that is that about 90% of nosebleeds are going to be anterior bleeds, meaning they occur in the anterior one-third of the nose and can be pretty easily visualized just with the naked eye. But that means that 10% or more posterior, and that's in particular more common in older patients.

So if you have a suspected posterior bleed or in patients where the epistaxis doesn't resolve with just pressure and topical therapy, and you're unable to visualize the source of the bleed with anterior rhinoscopy, those are all excellent reasons to consider doing nasal endoscopy. And then of course, if you have concerns about other pathology that may be underlying the nose bleed, things like tumors of the nose, if they have recurrent unilateral nose bleeds, for instance, if you have an adolescent

male that comes in with recurrent nosebleeds, you always want to keep in your mind, could this be a JNA, in which case doing a endoscopy would be helpful to rule that in or out.

Dr. Jason Barnes:

I next wanted to move on to some relevant anatomy. When we talk about the blood supply to the nose, can you fill us in on where this blood is coming from and kind of the distribution among the arteries that are supplying the nose?

Dr. Katherine Lees:

Yeah, so the nose has a very rich vascular supply that comes from both the internal and the external carotid system for the external carotid artery. You have the internal maxillary artery, which is one of the terminal branches. And that then gives rise to the sphenopalatine artery, which probably delivers the majority of the blood to the nasal septum and particularly the posterior nose. But the IMAX also gives off the descending Palatine. And then when you think about the internal carotid system, the ophthalmic artery has two branches, the posterior and the anterior ethmoid artery. And those are also supplying blood to the nose.

Dr. Jason Barnes:

And when we think about causes, this is kind of our differential diagnosis question. What are the causes that you're running through your head when you're treating someone with epistaxis?

Dr. Katherine Lees:

When I'm thinking about what might have caused it again, you want to go back to those particular risk factors or underlying comorbidities that a patient may have such as hypertension. Although that one's a little bit cloudy, because it's hard to say whether hypertension is causing a nosebleed or whether there's just an association between having a nosebleed and hypertension. You also want to think about anticoagulation and if there's any recent trauma to the nose, there can be more significant trauma like recent surgery or a facial trauma, but even minor things like digital manipulation of the nose or nose picking is going to be pretty common. And then you want to assess for other sorts of differential diagnoses.

I touched a little bit on JNAs before, but you also want to think about hereditary hemorrhagic telangiectasia or HHT. If they have underlying bleeding disorders, if there's potentially a neoplasm in the nose, either benign or malignant, some less common things would be like a vasculitis, such as granulomatosis with polyangiitis and finally things that are pretty common in the nose, but not necessarily directly causing the nosebleeds things like a septal perforation or a septal deviation are also important to look at.

Dr. Jason Barnes:

And what's your workup for these patients presenting with epistaxis?

Dr. Katherine Lees:

The majority of patients, the workup is just going to be your history and physical exam, and then whatever sorts of interventions you do. However, when you're dealing with patients that have a more severe or recurrent epistaxis, you want to think about underlying causes. So sometimes it's helpful to do laboratory studies. Doing a CBC to assess their hemoglobin and make sure they haven't had a significant

or chronic blood loss checking their INR, if they're on Warfarin or doing other coagulation studies in case you're thinking of an underlying bleeding disorder. And then most commonly, you just want to check what their blood pressure is. In some cases, patients will present in a hypertensive, urgency or emergency. So it's important to have those patients treated appropriately for their elevated blood pressure.

Dr. Jason Barnes:

And do you find that there's any real role for imaging in these patients also, including those possibly going for surgery?

Dr. Katherine Lees:

I would say that imaging is generally not needed, especially with their initial presentation or if it's a fairly uncomplicated nosebleed.

Dr. Jason Barnes:

And next moving on to treatment, could you walk us through the main ways that we can treat nose bleeds and kind of the ladder that you use in treating nose bleeds both for the first time and recurrent.

Dr. Katherine Lees:

So when I'm treating nosebleeds, I like to start with the simplest easiest things and then work up from there. And probably the easiest thing that a patient can do is holding pressure on the nose, which they should do for a constant period of time of at least five minutes. But I usually tell patients to do so for 10 to 15 minutes. I think it's really important first to make sure that there's no blood clot in the nose, which can be removed either through suctioning or having the patients gently blow their nose. And then when the patients are applying pressure, a lot of patients don't really know what the appropriate area to apply that pressure is. A lot of times they'll think they should do it on the high dorsum of the nose, over the nasal bones, but that's not very effective. So you have to counsel them on the importance of pinching the nasal ala against the septum, which is kind of that anterior two thirds of the nose, since that's where most of the bleeding happening.

If you aren't getting good resolution of the nosebleed or at least getting it slowed with pressure, you can also try medications in the nose. So most commonly these are going to be alpha-adrenergic agonists. Some are available over the counter, such as oxymetazoline, which is also known as Afrin or Phenylephrine. And these are going to provide vasoconstriction of the arterials and venules in the nose, which can at least slow down if not completely stopped the bleeding. It's important to keep in mind when you're using these medications that you want to have some caution in patients that may be higher risk, such as underlying hypertension, cardiovascular disease, or cerebrovascular conditions. And you need to be a little bit cautious using Afrin or Oxymetazoline in children under six years old, because it can have some untoward side effects. You can also use cocaine, which has the advantage, not only of providing vasoconstriction, but that also provides some anesthesia to the nose, but because that's a schedule two medication, it can be a little bit hard to acquire since you have to involve the pharmacy.

Dr. Jason Barnes:

And one of the medications that's been coming to the forefront more often is the use of topical tranexamic acid. Can you tell us a little bit about that?

Dr. Katherine Lees:

Yeah, so that's an anti fibrinolytic agent that can be used either intravenously or topically. So when we're treating nosebleeds, we're most commonly going to use it topically, and you can either do it as a spray or soaked on cotton pledgets. And there's been some pretty good research recently, including some randomized control trials that has shown the benefit of tranexamic acid or TXA over just pressure alone.

Dr. Jason Barnes:

And the last question I have kind of regarding medical management is what do you think is the usefulness of chemical cautery or silver nitrate in the setting of nosebleeds?

Dr. Katherine Lees:

So chemical cautery is going to be a great option in those anterior nose bleeds, where you can identify the source of the bleeding. So it's going to be hard to use if they're having a brisk active nosebleed, but if it's a slow bleed or has stopped and you can identify some prominent vessels in the anterior septum, silver nitrate is a great option for that. It is important to note that in those less common patients that have a bilateral nose bleed, you don't want to use silver nitrate or any other type of cauterization on both sides of the septum at the same location, as that can significantly increase the risk of a septal perforation, but usually in those cases, ENT is going to be involved in those things, and we're usually pretty prudent about preventing that type of complication.

Dr. Jason Barnes:

So we've talked about medical management, including topical spray and chemical cautery. When that doesn't work, typically move on to more procedural type things like packing. Can you talk us through some options for nasal packing?

Dr. Katherine Lees:

When we think about nasal packing, it kind of gets divided into two categories depending on what type of packing you're using, and that would be resorbable packing or things that are going to dissolve on their own. And that's for instance, Surgicel, Fibrillar, Floseal. And then you also have non-resorbable packing things that are going to require removal at some point in the future, that's going to be things like Vaseline, gauze, Merocel sponges, Rhino Rocket is very commonly utilized by our emergency department colleagues. So you kind of want to think about which of those options is going to be best for a particular patient. For the majority of patients, I would say starting with dissolvable packing is going to be the way to go. It has the advantage that you don't have to remove it. It's generally less painful, so better tolerated by patients.

And it avoids the potential for causing additional injury inside the nose, if you needed to remove it. It's great for patients that also have underlying pathologies, such as HHT or have elevated blood pressure, where you really want to minimize future manipulation of the nose. For the non resolvable packing, those are quite effective, but they are much more uncomfortable for the patients, not only at the time of insertion, but while they're in place and because they require removal that can cause additional bleeding or injury to the mucosa within the nose, so those are a little bit more unique in their applications.

Typically you'll only want to leave packing in for maybe two to three days, but you can leave them in for longer durations of time. One question that always comes up is when you use non-

resorbable packing, do you need to place those patients on oral antibiotics for anti staphylococcus prophylaxis? Because there is a small, but present risk that they could develop toxic shock syndrome. There's not a lot of good evidence to support that one way or the other, so you really need to just utilize your clinical judgment in determining if a particular patient would be benefited by that.

Dr. Jason Barnes:

And moving on from packing kind of the next rung up the ladder would be balloons. Can you tell us a little bit about when you choose to use a balloon and how to use them?

Dr. Katherine Lees:

So balloons are quite challenging to use. They are most commonly utilized for posterior bleeds. So ones that you're not able to see the source of bleeding with anterior rhinoscopy. And again, those are quite uncomfortable for patients, especially if you have to use them in both nostrils. So those should really be utilized with some caution. The only times that I've ever used them is when somebody has such a significant posterior bleed that I'm worried about protecting their airway. And I'm utilizing those as kind of a temporizing measure to bridge the gap before they can get more definitive treatments such as surgery or embolization.

Dr. Jason Barnes:

And can you give us some examples of what these balloons are?

Dr. Katherine Lees:

Yeah. So one is called an EpiStat and that can be used for both posterior and anterior bleeds. It has two separate balloons on it that you can inflate as needed, or if you don't have access to a more nasal specific balloon, you can just use a Foley catheter. Usually one of the larger ones available just to provide that posterior compression.

Dr. Jason Barnes:

So we've talked about medical management, some more procedural packing, non-dissolvable, dissolvable, and the use of balloons. I next wanted to move on to surgical management of epistaxis. Can you tell us about when to go to surgery for epistaxis and what are some of the things that you're doing or issues that you're addressing in the operating room?

Dr. Katherine Lees:

I would consider doing a surgical intervention in patients that have recalcitrant, recurrent epistaxis that has not responded or continues to recur, despite some of those previous measures we've discussed. I think it's also something to consider in patients that may have those risk factors for recurrence or having a future nose bleed. And some of these things can be done fairly simply even just at the bedside with some local anesthesia or even a little bit of sedation things like cauterization, but otherwise you'll need to escalate and consider doing something in the operating room under general anesthesia.

Dr. Jason Barnes:

Can you tell us about sphenopalatine artery ligation and maybe some of the anatomy of how you do the operation?

Dr. Katherine Lees:

Yeah, so sphenopalatine artery ligation or SPA ligation has become probably the most common surgical procedure for management of these recalcitrant nosebleeds. Previously, it was performed in more open techniques, such as through a sublabial or Caldwell Luc incision, but with the increased use of endoscopes and that technology, the vast majority of these now are being performed endoscopically. You'll often hear those referred to as a test ball. When you're doing these procedures, you do after remove any packing that's inside the nose. And again, you want to clean out any clot that may have formed and to find the location of the sphenopalatine artery, you need to identify the crista ethmoidalis. This is a small raised bony crest, just anterior to the sphenopalatine foramen, and surgically, you can identify this being just anterior to where the middle turbinate is attaching to the lateral nasal sidewall. Once you've made an incision in that mucosa, and you've elevated the mucosa kind of in an anterior to posterior direction, eventually you'll kind of see the artery tethering to the mucosa from that bony foramen.

Dr. Jason Barnes:

And do you ever find that you perform anterior ethmoid artery ligation in cases of epistaxis?

Dr. Katherine Lees:

That's going to be kind of a next step probably after a sphenopalatine artery ligation. It's not as commonly performed because it is technically more challenging and usually has to be performed through an open approach through a lynch incision in the skin next to the eye. Once you do that, you elevate between the medial orbital wall and the orbital contents and from the lacrimal sac anteriorly, you can expect to encounter the anterior ethmoid artery about 24 millimeters posterior to the lacrimal crest, another 12 millimeters posterior to that you can encounter the posterior ethmoid artery and another six millimeters posterior to that is when you hit the optic nerve. So obviously it's not very much distance between these very critical structures. So you have to be very cognizant of your anatomy when doing these things.

Dr. Jason Barnes:

And is there any role for IR embolization for epistaxis?

Dr. Katherine Lees:

Absolutely. So kind of in the early 2000's, the popularity of IR embolization was increasing, but some more recent studies have shown that it has fairly equivocal outcomes to doing a surgical procedure, but surgical procedures are about half the cost. So it's kind of waxed and waned in its popularity. Generally speaking, I think most ENT providers would assert doing a surgical procedure, like an SPA ligation and reserving IR embolization, if that measure has failed, but you can also consider doing it in patients that may be too unhealthy to go to the operating room or that are having very brisk bleeding. That's just being controlled with packing. And you're worried about removing that packing. You don't have to do that with embolization, so that can be an advantage.

Dr. Jason Barnes:

And when you're seeing patients with epistaxis, how do you counsel them on outcomes and expectations? And you kind of touched on this, but what are some of the pros and cons of surgery versus embolization or other treatment techniques?

Dr. Katherine Lees:

So both surgical ligation and IR embolization have success rates greater than 90%, which is quite good. Some studies have shown that for SPA ligation, it's upwards of 98%. So pretty equivocal outcomes there. But again, IR embolization ends up being about twice as expensive as surgery. There are various complications as well associated with these various measures. So for packing alone, there's a higher risk of recurrence of the nosebleed with removal of the packing or in the future. You also are considering that risk of infection or mucosal injury with removal of packing. And then if you're placing bilateral packs, there's always the possibility of having a septal perforation or more systemic cardiopulmonary consequences as a relation to that. With surgery, these ligation techniques are quite well tolerated. There is maybe a three to 5% risk of recurrence. And oftentimes that's just because only one of the branches of the sphenopalatine artery is ligated at the time of surgery.

You can also get nasal crusting and sometimes sinusitis from those surgeries. And then when we think about IR embolization complications about one in five, patients are going to have transient, minor complications, things like pain or numbness of the face, headaches, jaw, claudication, or complications from the access site, which is usually the femoral artery, but two to 4% of patients will experience a major complication, which would include nasal or skin necrosis, permanent facial nerve paralysis, blindness, or even strokes. So there are some serious complications with IR embolization. And so weighing those risks and benefits is always important.

Dr. Jason Barnes:

And how do you follow up with these patients?

Dr. Katherine Lees:

I usually like to see patients back, if not just for nasal packing removal, just for a recheck within a week of their initial evaluation to see what the recurrence has been, or if they've been well controlled. In those patients that do have underlying risk factors like hypertension, rechecking, their blood pressure, and then directing them to improved management of that either by their primary care doctor or otherwise can be helpful patients that are on anticoagulation for instance, having had a heart attack or a stroke, you're not going to want to stop that anticoagulation just for the sake of their nose bleed. But if they're doing it for entirely preventative purposes, without their doctor's explicit instruction, they may be able to stop taking, for instance, a baby aspirin, if they don't have a lot of risk factors. I think the most important thing with that follow-up visit is educating patients and family members or caregivers about how to prevent nosebleeds in the future.

Dr. Jason Barnes:

Could you give us your one liner or two liner on how you educate patients on these preventative measures?

Dr. Katherine Lees:

Absolutely. So, I kind of divided into prevention of nosebleeds and management of nosebleeds, if they do occur. Preventing is keeping the nose moist either by using saline spray, or irrigations, moisturizing, gels, or ointments, and even just having a humidifier next to the bed when they're sleeping. And then for management of a nosebleed at home, they should be applying pressure for about 10 minutes and they can have Oxymetazoline or Phenylephrine available at home if pressure alone, isn't fixing their nose bleed.

Dr. Jason Barnes:

Well, Dr. Lees, this has been great discussion on epistaxis next move into our summary. But before I do, do you have anything else to add on the topic of epistaxis?

Dr. Katherine Lees:

I don't think so. I think that's it, in a nutshell.

Dr. Jason Barnes:

Well, very good. Again, to summarize epistaxis is quite common and can affect up to 60% of the population. Initial considerations include ruling out airway compromise or hemodynamic instability, and then determining how long the patient has been bleeding, the amount of blood loss in any other comorbidities, including hypertension and anticoagulation. A good first step is almost always clamping the nose. Usually after topical application of a vasoconstricting agent, additional topical therapy can include tranexamic acid and inhibitor of fibrinolysis. When this topical type therapy fails, nasal packing can be considered. This can be in the form of dissolvable or non dissolvable packing. In severe cases, balloons such as an epistatic or a fully catheter can be used and then surgical intervention can be considered in those refractory to these treatments. These include sphenopalatine artery ligation, and anterior ethmoid artery ligation, as well as IR embolization. Dr. Lees, thanks so much for being here.

Dr. Katherine Lees:

Yeah. Great to be here. Thanks Dr. Barnes.

Dr. Jason Barnes:

I'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 to give you an opportunity to think about the answer and then give the answer. For our first question, what is usually the best first step for a patient presenting with epistaxis? Typically the best first step for a patient with epistaxis is topical application of a vasoconstrictor, then applying a clamp for up to 15 minutes. For our next question, describe the main blood supply to the nose. The majority of the nose is supplied by the sphenopalatine artery, which gives blood supply to the majority of the nasal septum and the lateral nasal wall. The anterior ethmoid artery supplies, the majority of the anterior septum and anterior lateral nasal wall.

There are also additional smaller contributions from the posterior ethmoidal artery, greater palatine artery and superior labial artery. And recall that the SPA is a branch of the internal maxillary artery and the anterior ethmoid artery is a branch of the ophthalmic artery from the internal carotid system. For our next question, describe the anatomy of SPA ligation. For SPA ligation, you want to find the crista ethmoidalis, which is a small raised bony crest of the palatine bone. This is located on the posterior lateral nasal wall, near the attachment of the middle turbinate. Once this is identified the sphenopalatine frame, and it will be found just posterior to this. And for our final question, describe the anatomy of locating the anterior ethmoidal artery and surrounding structures. So recall that a lynch incision will be made and the lacrimal sac will be identified. From the lacrimal sac, it's 24 millimeters to the anterior ethmoid artery. And then it's another 12 millimeters to the posterior ethmoidal artery and then another six to the optic nerve. So this follows the 24, 12, six rule. Thanks so much for listening and we'll see you next time.