

JEFF TERRELL: Hi, my name is Dr. Jeff Terrill from the University of Michigan Department of Otolaryngology, or Ear, Nose and Throat Department. And this is a talk on a relatively new treatment called coblation, for treating patients with HHT who have nosebleeds-- not necessarily for every patient. But we'll talk about which patients may be candidates.

So first of all, I'd just like to talk about the different levels of severity of blood vessel malformations and nosebleeds in patients with hereditary hemorrhagic telangiectasia. More information-- general information about HHT can be found at the curehht.org website, of course.

But many patients will have what we call small telangiectasias. Small telangiectasias are just slightly prominent blood vessels. You can barely see the telangiectasia that the green arrow is pointing to there. It doesn't project all that well. There's some real small ones also on the left side of the screen, but a little bit out of focus, off to the far left.

As the telangiectasias get larger-- one may call them small arteriovenous malformations-- they tend to start to become a little bit raised. When I see raised ones, I think about changing the name to arteriovenous malformations. As they get larger, like you see here with this one-- I would call this a small- to medium-size arteriovenous malformation. Now it's raised. It's not just a little blood vessel underneath the surface. It's not the couple little squiggly spider veins. It's actually a raised lesion. And if you look at it carefully, many of these will be slightly pulsatile. They'll bound with one's pulse.

As they get larger-- and here's another medium-sized one. As they get larger, they become a problem-- a much bigger problem for nosebleeds. And here's one with sort of a crust that's recently bled. And there's a fibrinous sort of crust or scab over top of it. But if I were to touch that with a suction, the one with the green arrow on it, there would be a pulsatile nosebleed. And that would be an artery that's feeding this mass of blood vessels here.

And so these are the different types, or the severity of arteriovenous malformations that I see and how I kind of structure my thinking about them. And then sometimes you see really small arteriovenous malformations, sort of a broad spider web texture or look to them. They're not raised. They're just broad and not very deep.

So how do we treat these surgically? So first of all, not every patient with telangiectasias and arteriovenous malformations needs any type of surgery. Many times, especially the small ones are minimally symptomatic. They don't bleed very often. And conservative treatment, which has been outlined in other web resources, is appropriate.

But sometimes they do bleed. And the small telangiectasias, if you need to do anything at all, sometimes just a silver nitrate stick, which is a little chemical stick that will chemically destroy it and have it healing with scar tissue. I don't do this a lot. I don't think it works as well as other things.

But if someone's, say, pregnant, or can't have general anesthesia, and they have these small nuisance nosebleeds-- if they're very small, silver nitrate can work. But most people don't go to the doctors for just minor, occasional nosebleeds. Usually people-- by the time they present, there's something way more than this going on. And silver nitrate may not be appropriate.

As they get larger, these telangiectasias, or small arteriovenous malformations, they'll become raised. And so when you start seeing those, these patients will get nosebleeds that might be several drops to a few teaspoons. They may be typically minor nosebleeds. But they're frequent.

And of course, they are annoying as heck for people. They may get nosebleeds on a daily basis, or more than once a day, but typically very small nosebleeds. There's not a lot of pressure behind these. There's not a large bounding arterial pulse behind them.

So we can occasionally treat these patients with silver nitrate in the office. But usually, like this patient, there are several of them. And you wouldn't want to treat a lot of the nose surface with silver nitrate.

More recently, at the University of Michigan and other places, we've been doing sclerotherapy, which is like injecting them with a chemical that turns into scar. It's the same chemical that people inject in legs-- that have these spider veins in legs-- to scar off the spider veins. So that technique has been used for a long time. And I'm not going to talk about that much more here today.

As these things get larger-- here's one that's a little bit larger, just inside the nose. It's raised. The walls can get thin. And these patients will bleed tablespoons at a time frequently, sometimes a little bit more. They'll bleed enough, or frequently enough, in large enough quantities that they become anemic and need to be on iron because of the anemia.

These patients, when they start bleeding more, usually there are several vessels. And I will oftentimes take these patients to the OR if they have a lot of these vessels. And we will do either electrocautery, suction cautery, or now-- I'll talk about it in the remainder of the talk-- coblation in the OR.

There are some people-- and I have done some Avastin injections. Beyond the scope of this talk, but Avastin's a drug that helps mature the blood vessels. And I suppose if you just had a few of these small ones, you could try sclerotherapy in the office as well.

But when they get to the next size, these-- what I call large, bulging arteriovenous malformations. And these are the ones that gush when they bleed. They have an arterial pressure behind them. This is probably a small one, I would say.

If you look at them in the office as a doctor with an endoscope, you can see that they're actually pulsatile. They may be one, maybe even two centimeters. They may be under the surface. But when a patient comes to me and says, oh, yeah, I can bleed a quarter-cup, half-cup, one cup at a time quickly, and it just streams out of my nose, I don't usually try any office procedures. Those patients you see in the right column, I will take them to the OR to do coblation or cautery.

If they do get packing in the nose, I would prefer to take out the packing in the operating room. So if they're really bleeding, they'll oftentimes be packed just to control the bleeding, stop the bleeding, stabilize them. But patients with HHT-- know that when you take out the packing, if you don't do some sort of surgical cautery or coblation, it's going to really bleed again.

And then a last thing, what I'm not going to talk about-- if all else fails and people are getting these gusher-type nosebleeds, arterial nosebleeds with high volume, quick, fast nosebleeds, some people get the Young's procedure, which is a procedure-- again, I won't talk about more. But it is sewing the nostrils shut in a way that's sort of recessed, and hopefully not too cosmetically visible.

But today, I'm really going to talk about coblation. Coblation as a new technique or new tool in the armamentarium for ear, nose, and throat surgeons. So before I talk about coblation, just very briefly wanted to talk about some of the other possibilities.

Electrocautery, which is suction cautery-- in the upper right-hand side you can see, that's a suction cautery being used elsewhere in the nose. But it's electrical cautery. And having some experience with HHT, having some guidance, having some training is usually helpful for being successful with the cautery. So that mentorship is priceless.

The second tool that's sometimes used is bipolar. And that's just electricity goes between the two tines, in that picture with a white background. The bipolar cautery works pretty well for small lesions. But once they start to bleed it becomes a problem, because it doesn't work well if there's blood coming out of the vessel. Some of them have suctions associated with them as well. But if it's really bleeding, this is a tool that's hard to use.

Septodermoplasty, the third bullet there, is really a skin-- it's scraping the lining of the nose and replacing it with a skin graft. I think that's really fallen out of favor over the last five, 10, 15 years, primarily because the skin sloughs. Dry skin debris kind of gets collected in there, gets a little odorous, kind of foul smelling. And there's a fair amount of maintenance.

It works fairly well for several years. But eventually the malformations break through it and it bleeds again. And the downside is the amount of maintenance and odor and cleaning that it requires. We'll talk about coblation in a moment, the new technology. And then Young's procedure, I already referred to.

So next slide really talks about coblation. Coblation-- this is a typical tool. It's provided by a company called Smith & Nephew. This wand that I'll show you is the one I prefer.

Coblation uses radio frequency energy and creates a plasma field, which is really-- it frees the sodium ion from some salt water, from saline or sodium chloride, salt water solution. It frees the sodium ion. The sodium ions break the tissue bonds and dissociates the tissue so it breaks apart. And then there's a little suction in here that suction the material out.

And the thing is, it works at a fairly low temperature compared to electrocautery. And so there's less thermal damage, less burn to the deeper tissues. It stays right on the surface and slowly works its way through the malformation. So there's a picture of that, and some illustrations of how it works.

They come as what we call wands, as a surgeon. And they also have what we call a bipolar component to them. So on that left picture, between those metallic ridges, there is some electricity that goes between them as well, the typical electrical cautery. So it does a combination of coblation and cautery. It's been used for many years in different types of surgeries, and has been reported as particularly useful for HHT patients in several articles in the literature. I've recently started using it and been pretty impressed with it.

So I just want to talk about some of the principles of coblation, in case there are some surgeons that are watching, because I think it is very helpful. Just like any other instrument, you really need to know the instrument. I would recommend that you have the instrument representative come in and give you some tips on using it, because I can't cover them all in this video.

I recommend that people clean out the nose. It's done under general anesthesia. So clean out the nose of blood and crust. And then find the lesions that are out there. So this is a nose that may have had some bloody crusts in it. But I removed them out.

Then you can see that there are several raised arteriovenous malformations that you've seen before. I tend to look for the larger lesions and work on them first, because those are the ones you want to really get. You might have to leave some smaller lesions if they overlap on the septum in the same area, for risk of septal perforation.

But remember, it's easy to miss several areas. And for the surgeons that are listening, the floor nose oftentimes has some larger vessels along the floor of the nose. The apex in the valve area, you can see in the top right-hand photo, I'm holding the nostril open to see a lesion on the septum near the tip of the nose.

Or sometimes they're up on the side wall, near the nasal vestibule, just inside the nose. So it's important to look for those. And then some of the harder ones are way up at the top of the nasal cavity where it gets narrow. But you need to find those, because you want to get the ones that are bleeding.

So I recommend cauterizing or coblating the larger lesions first. We're talking about coblation today. You really want to make sure that the whole lesion is ablated. So these things can be underneath the surface. You may be seeing just the tip of the iceberg, where it breaks through and bleeds. But sometimes it's five, 10, 15, 20 millimeters wide underneath the surface. And I'll show you that in the video that follows.

So don't stop until you get all the edges of the AVM bleeding, because it spiderwebs out a little bit. And then I recommend that you tweak the edges-- you kind of rub the edges. When I see patients with HHT, at the end of the surgery I actually will really irritate the nose and rub it with a suction or tool or fingertip, to make sure that all the edges that are going to bleed have been identified and treated.

Try to not overlap the same areas of the septum, left and right side, because you can devascularize it and get a septal perforation. But having said that, I think it's important that patients and doctors both realize that sometimes there are very, very large arteriovenous malformations that actually go through the cartilaginous septum. And they won't stop bleeding until you get the whole malformation out. So sometimes surgeons need to create a septal perforation because of the very large malformation that actually go through and through it. Otherwise, it's unsuccessful.

The coblation equipment, I've got some pictures here. It's a picture of the wand, or the action end of the wand there, at the top left. There's a foot pedal for the surgeon, for coag and ablate. And typically we're using the ablation, but sometimes the, coag.

And Then we do have saline that runs through the wand. It has to be saline, not water, because saline's got the sodium atoms that turn into ions. And there's a coblate and coag setting that's typical. Or I think it's automatically set for each hand piece. So there's pictures of the equipment.

There's the wand. For those of you that may be interested in this, this is the company, what it looks like, and then the typical settings, and the reminder that you use saline as an irrigant and a cleaning solution. So you can put the wand under saltwater-- under saline-- in a little bassinnet, and hit the foot pedal to ablate anything that might plug up the wand. Because remember, there's a suction in the middle of the wand. And sometimes that gets caught up with some blood. Again, your representative will give you some tips on cleaning it.

So now, here's some smaller lesions. Here, the arrow's on a small to medium telangiectasia. There's a medium telangiectasia and AV malformation there. And the third arrow is on a moderate size raised arteriovenous malformation.

So now, this is an endoscopic view of live video showing you these small lesions. Here's a small to moderate size AV malformation with the coblation working. And you can see that it is important to get the entire lesion. And that was easy with that one. A smaller one now, and you can see the coblation is working. And we got that one very easily. This patient has many, many small AV malformations and, of course, some telangiectasias as well.

This is one on the floor of the nose that I'm pointing to here. And it looks raised. You can see that it's not just the tip of it's raised. It's a small sort of mountain. You're just seeing the tip of the mountain, where it looks like you can see the vessels. But you're going to see in a moment that it is substantially larger. And I keep trying to coblate the edges. And one edge keeps bleeding. So I've learned over time to watch for that.

And then also, just look at it. Poke it a little bit and make sure it's not going to bleed. There is a little bit more, to just the bottom-right of the lesion. And it starts to bleed. And you'll see in a minute that-- oh, whoop, now it really is either another lesion or the same lesion that I'm getting. And you can see it takes-- it's substantially bigger than what you saw, the tip of the mountain that you saw.

So this is the coblation setting on six or seven, typically works well. And again, you'll see me rough it up and make sure there's nothing else bleeding. Then I'll move on to other lesions. I'll usually start with the worst-looking lesions first. This is not particularly bad. It's easily coblated. You can see the saline going through the coblation, because the saline carries the energy. It carries the ions. So it's always rinsing with saline. There's actually-- the tip of the thing doesn't actually touch. You want a little bit of space, that's less than a hair between the tip of the coblator and the lesion.

Here's a lesion on the sidewall, left nose. You can see this is a fairly large lesion, probably a good centimeter. If you can look carefully, you might see it pulsing-- the blood pulsing as it comes out. This is one that has a large or significant arterial component to it and was bleeding. And it was relatively easily controlled with the coblation. But you can see still, there's an edge that was bleeding.

And I just keep working that until it no longer bleeds, to make sure I get the whole AV malformation. And sometimes they're deep. I've had them start to go to the cheek tissue a little bit, and chased them into the cheek a little bit too. But you can see me roughing it up. And that takes care of it.

Now, farther back in the back of the nose, usually people don't bleed from the lesions in the back of the nose. This one looks like-- you can see a clot on it. It looks like it may have bled. Usually the ones that bleed are in the front part of the nose. Here's a little clot right on the top of the mountain there, right at the floor of the nose.

And so I'll get the coblator back there and look at that. Sometimes it's a little hard to see where you're coblating. And you can see the coblation has a suction on it, just to get rid of the water in the nasopharynx, back by the adenoids.

So I've come back to that lesion now. I'm looking at the lesion, trying to get a good view of it. And then I'll get the coblator on that lesion to get it. That's several millimeters, definitely raised, probably would be pulsatile if I could see it pulsing. But I'll coblate that. And it can take a couple of minutes to get a good view of it and get the whole lesion out.

Now-- sorry for the pause. Now you can see that the rest the lesion, I've gotten most or all of it now out of there. And I'll just do a little bit more coblation to be sure. Must have been some small area that looked suspicious.

Now there's one above it there. I'm going to turn the coblator around and get the lesion above it. This one, again, you're just seeing the top of the mountain. But as I coblate, you'll see that it just keeps bleeding. There's an edge that keeps bleeding. And keep working at that until it's gone.

This will take me a minute or two to get the entire lesion, back along the posterior part of the nasal septum. And you can see that it coblates the mucosa. But it looks like it's leaving the pericardium, which is good. It means that less chance of a septal perforation.

But I keep looking at this. You'll see little vessels that will start to go. This might be the edge of the AV malformation, I suspect. And so we will coblate that until it's no longer bleeding, because that's the only way I feel safe that I've gotten it. You can see, just you touch something and it gets going again. And I like to make sure I get all the vessels.

Again, this is on a coblation setting of six or seven and a cautery of three. There are optimal settings to do the best coblation and the least amount of thermal injury with a cautery.

So that looked like a small lesion. But of course, it is substantially bigger. And that will heal with a very thin layer of mucosa and hopefully be quite a long time. Here's another one that I was not appreciating initially, until I got near it. And then I realized that there's this pulsing lesion up in the left superior nasal cavity. This is hard, because the nose is narrow up here.

But this is a substantial AV malformation, bled quite a bit, which wasn't pictured. And I have to end up coblating quite a bit. I've edited this video, just for a time. But it takes a while to get the entire edge. I saw this patient back. And there's a nice, thin layer of mucosa in this area, which was all a raised malformation at the time of surgery.

See my arm is getting a little fatigued. I'm getting a little shake in the camera, which is-- this is magnified many, many times. This is the coblation. We typically operate with a large 20-, 25-inch TV. This is quite a small area. The coblator is about 4 millimeters, five millimeters in width there.

So again, important that you get all the edges of that. Here's the lesion, just so you can see, with several raised lesions near the suction. But now you can also see the vessels bleeding. And along the floor, closer to the floor, where those little yellow crusts are, that's a large arteriovenous malformation that is there, and has a substantial arterial blood supply to it that we eventually completely coblated. So you've got to be looking for those larger arteriovenous malformations.