

SANDEEP

Hello, everyone. Welcome once again to the University of Chicago Medical Center, the cardiac cath labs. We're

NATHAN:

continuing our radial training series with another diagnostic radial procedure. Possible intervention. We'll see what we find. We're set up for right radial access, as you'll see here. We actually have-- underneath the patient, we have RAD board, where we have a foam insert for supporting the wrist. And the elbows you can see here. And the patient is positioned under the camera, which is in a LAO view, to keep it out of our face but still allow us to see the antecubital fossa on the screen when we're navigating the wire.

You can see, once again, my landmarks-- flexor creased, styloid process tendon. We've got the fenestration right over the wrist. This gentleman is about six feet tall, so we're going to want to go just a little bit higher, to make sure that we don't run out of catheter length, in case we encounter subclavian tortuosity. So we'll go ahead and numb up. As has already been mentioned, we're going to give just a tiny little bit of a local anesthetic here. So you're going to feel a little bit of pinch and a burn. Little pinch, and a little burn. Tiny pinch.

OK.

Some burning here in the wrist, and then it'll start going numb. We're going to give about two ccs, one and 1/2 to 2 ccs of Lido, just as a very superficial wield. Make sure that it sort of spreads out underneath the skin. As I mentioned, again, previously, it's nice, I think, before the area gets too distorted, to mark off exactly where you intend to go with the sterile marker that comes in the kit. And then use that to position your hand as you're tethering the vessel. I'm going to give just a little bit more lidocaine here. Maybe just a touch higher.

We're going to try to accomplish what we need to here with 5 French radial access. All right. I'm just going to step on the floor and make sure that we have--

Do you feel anything sharp? Let me know, and we'll give you more numbing medicine, OK?

Once again, we've got a 20-gauge angiocath that we're going to do through and through puncture with. I prefer this over micropuncture. But certainly if you're comfortable with micropuncture, you could utilize micropuncture. And we've got the O21 guide wire, non-hydrophilic guide wire, that comes in the 5 French radial kit. We put a little bend on it just so that we can navigate around the current vessels.

So we're going to try to tether the vessel. Minimize rolling. Radial pulse is not the strongest, but reasonable.

How much longer?

Not very much longer. Just getting started.

OK. Blood in the barrel, going all the way up. That's a nice filling. We're going to go away about two or three millimeters. Going all the way through the vessel. Going to put a little bit of traction. Pull back.

Try not to move. OK. Wire went in very smoothly. We're going to go on fluora. [INAUDIBLE], please. And just make sure we're past the antecubital fossa, which we are. How about with the angiocath? And then go in, put the 5 French radial sheath. No skin [INAUDIBLE]. Just a constant pressure. And advance through this plaque as we can.

[INAUDIBLE].

I'm just narrating here for the camera.

All right. OK.

All right. You're going to feel a little pressure in your wrist, OK? We're just sort of leaning on the sheath here. Don't leave the wire. OK. Sheath is in. Wire and dilator are out. And we'll go ahead and put a medium Tegaderm on it, once again, to tether it in place. And we'll give the radial cocktail.

What would you like [INAUDIBLE]?

So let's do 65 kgs. So 70 times 40 [INAUDIBLE]. Let's give 3,500 of heparin and 200 of nitro, please.

OK.

We're going to omit the calcium channel blocker in the cocktail this time, because of LV dysfunction. And you can certainly do that. But recognize that CCVs are a little bit longer-acting in terms of what we're [INAUDIBLE]. CCVs are a little bit longer-acting in terms of preventing spasm.

OK, here's our opening pressure. I think it's important to just transduce a pressure in patients who have marginal blood pressure to begin with. Just to ensure that their pressure doesn't fall immediately after sheath insertion due to vagal tone. We'll go ahead and get the cocktail.

We use a 5 French universal catheter for this case. May as well show you that. This is the Ultimate II by Merit Medical. 110-centimeter shaft. And it has one side hole and one end hole. Just hold that in place there. And this is good for getting native coronaries, LV, and some vein grafts. Not so good for getting internal mammaries, either ipsilateral or contralateral internal mammary arteries.

All right. Position this. While we're waiting for the cocktail, we can talk a little bit about guide wire selection, here. This is really sort of a personal preference thing. I prefer to use the Wholey wire. But could certainly use other wires. This one is kind of bent up. Tip's a little bit bent up. If we could get another Wholey wire, that'd be great.

Another Wholey wire?

Yeah. [INAUDIBLE] underneath the [INAUDIBLE].

So we're going to go ahead and give the spasmolytic cocktail, a fresh hit of heparin, 50 units per kilo, and 200 mics of nitroglycerin. Move the radial sheath. We'll take a picture to make sure that the caliber of the vessel is appropriate. There's no twists and turns. No vascular anomalies.

OK. Meanwhile, I think we can also talk about the guide wire. So here's the Wholey wire. This is really a matter of personal choice. You could certainly use other wire. What you don't want to do is use a J-wire. A small radial artery, the J-wire will come out straight, potentially traumatizing the vessel. There's a number of specialty wires that are now made with small J's, one centimeter or less, half-centimeter J's at the tip of it. This is just a nice atraumatic torquable wire. 175 centimeters.

[INAUDIBLE].

It's going to burn just a little bit as it goes in. That's some medication. OK?

Yeah.

Everything's going great.

All right. We'll set this up for DSA. Boy, that's about the straightest radial artery you'll ever see. So no need for fluoro mapping here. Nice caliber vessel. You can see from the angiogram-- which should be inset here-- you can have a 6 or 7 French sheath in this vessel without any problem at all.

All right. So we'll swing the camera back now. And we're going to go in with the universal catheter.

All right. So once again, we've got the Ultimate II catheter, 5 French side hole and end hole. Very similar shape to the Terumo Jacky catheter. It's a universal curve that can get a lot of different vessels, as well as the Ultimate. Go ahead.

Let's get me out of here.

Almost done. Everything's going great. Another Lido 25, please. OK. Going in the veins with that part. OK. Keep going.

OK. We see the catheter coming up towards the subclavian. Seems to be sort of diverting towards the carotid, here. So we're going to try to torque this. And it's into the [INAUDIBLE]. All right. Go ahead and advance that. To the level of the [INAUDIBLE]. We're going to pull it back and see if we can redirect it into the groove. Go ahead. Pull it, please. We're going to rotate overhand with the catheter as we get close to the groove. Get it into position. [INAUDIBLE] OK.

All right. Central AO.

130 over 86.

Thank you. [INAUDIBLE]. All right. See if you can go ahead and manipulate that now. Catheter in place. [INAUDIBLE] to non-coronary. Pull back just a little bit. Work it. Might be in RCA. Still, we're in RCA. Go in and take that. [INAUDIBLE].

Giving you a little bit more relaxing medicine, sir.

Huh?

We're giving you a little bit more relaxing medicine. So why don't we just focus on here. This gentleman is about six feet tall. Got a 110-centimeter catheter. A little bit of tortuosity in the subclavian, and this is how much we have outside the body. If there's a significant amount of tortuosity or distortion at the juncture of the brachiocephalic into the aorta, you're going to lose a little bit more catheter length here. I personally feel that 110 is probably a better choice all around than 100 centimeters, recognizing that from a right radial approach, this happens relatively often.

Can we get going? You can knock me out. [INAUDIBLE].

[INAUDIBLE]. Get more [INAUDIBLE] out of the RCA. [INAUDIBLE]. Just some disease in the RCA.

Now we're going to use the same universal catheter to try to get into the left system. If we could sort of focus on the finger-torquing motion. Most radial catheter manipulations, we're talking about just a subtle torquing of the fingers, as opposed to big movement. And you may need to sort of push-pull to transmit the torque.

So we've unseated from the RCA, here. Then we're counterclocking it to get into the left coronary cusp. OK? [INAUDIBLE]. OK. And now we're into the left system. So it didn't take a whole lot of manipulation to get into the left system, there, with this catheter. But I think the key thing to recognize is that with your left hand, you may need to push-pull just a little bit to transmit the torque. Otherwise the catheter will make one full rotation, and you're going to come back more or less to the same spot. All right, see? [INAUDIBLE].

That looks pretty good. All right. Pull. All right. Pull.

OK. So we've found a lesion in the RCA. This gentleman's been having some arrhythmia, known reduced ejection fractions, some ischemic changes, make the biomarkers. We're going to use a 5 French Ikari right guide. And we're going to exchange out over a guide wire here. So, Ikari 1 or 1.1? 1?

Yes.

Yep. Ikari right 1. All right. Let's seat the catheter. And exchange out over a 260 J-wire. You can go ahead and get by the valve. We'll then flush the radial sheath. And then set up for an intervention.

So he's already received some heparin as part of the radial cocktail. We're going to go ahead and give a full dose Bivalirudin in our lab. Majority of interventions-- or a significant chunk of interventions-- are performed with Bivalirudin. You can certainly give weight-adjusted unfractionated heparin as well, if you'd like.

OK. So we're going to reach into the RCA. Just make biomarkers that [INAUDIBLE] venous stability. We're going to go ahead and fix it. We're swapping out the Ultimate II for an Ikari right guide 1.0 in 5 French. We're going to try to get this done with 5 French access that we have. So we've swapped out over a 260 J-wire. We've still got our 24-inch connector and a 2E on it. And this guides. Watch this [INAUDIBLE]. You can go ahead and give Bivalirudin whenever you are free.

Yeah.

All right. There. I got your wire. Go ahead.

So the Ikari's going in. We've got the wire in the aortic groove. All right. Here it comes. OK. We're going to leave the wire in right there.

So with lower-profile catheters, sometimes torquability becomes a little bit of an issue, particularly if there's subclavian tortuosity. We're going to go ahead and leave the wire in, just to enhance our torque response. We will, obviously, aspirate and flush it first. But then we'll do a maneuver manipulation with the wire in place. And then remove the wire once we've seated it in the RCA. This can be particularly helpful if you have subclavian tortuosity or frank subclavian loops to prevent the catheter from crimping and enhance the one-to-one torque response.

Five hour bolus 10. Continuous rate 23.

OK. So once again, we're going to sort of push-pull with our left hand and torque with our right hand. Find the LV in our travels, and we should be good. Little pump there, please. Just underneath it. How about there? Good.

[INAUDIBLE].

OK. Our guide is in. And we'll back bleed it. Flush it. [INAUDIBLE] when you're ready for an [INAUDIBLE].

OK. Five [INAUDIBLE] 10.

Thank you. Go ahead and take that guide wire, please. So at this point, once you have catheter seating, it's more or less like any other intervention. I think the key is to have good catheter seating right out of the gate to know what your radial guide options are.

[INAUDIBLE].

What do we have for stents?

I've got an 18, 22, and 26.

22 should be fine.

[INAUDIBLE].

I think so, right? [INAUDIBLE].

You said 22, Dr. Nathan?

You know what? We'll measure it against the end of the wire, here.

OK.

Go ahead and [INAUDIBLE]. OK. So that's 30. 22 should be fine. What do you think? OK, so we'll take that three to 22, please. [INAUDIBLE].

Projections are really tinier. The 4 French intervention, we're not quite there in the United States, but 5 French intervention from a radial approach, particularly for-- well, for the straightforward disease, is a nice option. Decreases the time to hemostasis. And, obviously, there's immediate ambulation after the procedure. Go ahead and play that back. I think we'll try to graph stent this with a 3.0 by 22 stent.

OK. So we've got reasonable VAD catheter seating. I'll just talk for a moment about VAD catheters. You could certainly use Judkins catheters or [INAUDIBLE] curves. There's a number of dedicated radial guides, both for left and right system. I think it matters less for the right system, where JR4 works, or even JR5 works, in the majority of cases. For the left system, for extra backup, it may be worthwhile from a right radial approach to have some dedicated radial guide catheters. And we'll talk about that in a subsequent module.

Got the wire? Yeah?

Mm-hm.

You can see that we're working kind of off the table, right here. The addition of a work space underneath can be helpful. It'd be light. You can position it appropriately. You may or may not need that. The RAD board underneath him also confers some radiation protection, which is obviously important.

OK, that's not a bad position. I think you can probably come back just a tiny little bit. We're going to do a half-and-half injection here, because this is a 5 French system. Little bit harder to inject around it. I think that's a pretty reasonable spot. Yeah?

Mm-hm.

Up. Go get some nitroglycerin, please. Good.

May I have an ACT, please?

Yup. All right. 16.

[INAUDIBLE].

Yeah, it's going to be a little oversized. We'll give some nitro. Try not to move. Almost done. All right. Good. 200 of nitro.

OK.

[INAUDIBLE]. It's a little split, proximally. And a little spasmy distally. OK. So fix another set. Give it 275.

[INAUDIBLE]. Let's see what you have. Probably need two short sets, 2 5 distally and a 275 proximally. Short.

OK.

Nines. Looks like we've got a little split distally and proximally, so we'll try to tack those up.

[INAUDIBLE].

OK. So we're done with the RCA intervention. We're going to take a couple more pictures, here. And then get the catheter out. We're going to use this radial band by Merit Medical today for compression.

[INAUDIBLE].

Almost done. OK. So that looks great. We're going to load him up with some Ticagrelor. And I've unseated the guide catheter here. We're going to pull this out over guide wire. Use Bival for anti-coagulation. Typically, the compression time is about three hours in our lab, irrespective of what anti-coagulation we used. And about ninety minutes for diagnostic procedures, assuming that they get [INAUDIBLE] of heparin for the procedure as part of the spasmolytic and anti-coagulant cocktails.

We flush the radial sheath. If, at this point, you don't have any bleed-back, this is a good opportunity to try to figure out what's going on. Typically, it's either spasm or thrombosis of the vessel. If it's thrombosis of the vessel, potentially it could be thrombectomized. And I'll cover that in a subsequent module.

So now the radial sheath is going to come out. We're going to take the Tegaderm off. We're going to-- very [INAUDIBLE].

All right. Sit tight for me for just another three minutes, and we'll be done, OK? Get you off the table, get you something to eat.

We'll do soap. We'll go ahead and position this. So you can position it either way. You essentially want the clear portion of it, which is going to be the inflation cuff, to be right over where you entered the vessel. Positioning it away from the sheet gives you a little bit more latitude in terms of adjusting this. Then take the adhesive off. We're going to put it more or less right where we entered the vessel. Go ahead and raise up your hands. We may need to reposition this a little bit. This material can easily be repositioned over and over and over, if need be. He's got a very skinny wrist here, so it's going to sit at a little bit of an angle. But I think it'll be fine. And so that's more or less where you want to be. Maybe a bit lower than that.

7 ccs in there.

You said seven?

Yeah. Not super-happy with the position, so I'm going to just go ahead and adjust that again, and make it a little bit more lateral. There's a piece of rigid plastic here, so it's going to conform to the shape of the wrist to some degree once you inflate this. Just be cognizant of that.

OK, you're going to feel some pressure down here, sir.

So you can use-- one of the nice things about this device is that you can use any syringe that has a Luer-Lok on it. Position this one more time. It seems to be slipping medially. So let me get it off one more time. Position it maybe just a little bit laterally, recognizing that it's going to roll just a little bit.

Try not to move your hand. Almost done.

OK. I'm happy with that. So I'm just going to go ahead and put the Luer-Lok on.

Lots of pressure down here. Try not to move. It's a very narrow table, OK?

Yeah.

And we'll come out with that. We are going to deflate it just a tiny little bit. And reinflate it once we get a little bleeding.

All right. Once again, we'll look for patent hemostasis. Compressing the ulnar. Looks like we've got a good radial wave form. At least no worse than it was at the beginning of the case. And I think we're in good shape. With the McKay-- now Merit-- radial compression device, the RAD board, and the accompanying foam insert. Thank you so much.