

### Transcript Details

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## Managing Complex Cases in Vascular Access Care

Mr. Ostroff:

Hi Dr. Nelson. So we've had a couple of patients that have been, you know, really complex. One of the cases I wanted to present to you was a 65-year-old female, and she was sent from a nursing home with a complete bowel obstruction in septic shock. Her past medical history consists of diabetes, multiple sclerosis, colitis. She had cardiac arrhythmias that were treated with left-sided AICD. She was a stage IV renal failure patient. She is currently on hemodialysis, but her fistula failed on the left side, so she has a Permacath on the right side. She is going to require TPN and antibiotics, and possibly pressors because she remains hypotensive despite the fluid bolus that we've been giving. So the ICU doesn't have any beds at this time, and she is going to be stuck in the ER for at least six more hours. So our dilemma is that we have a 22-gauge that the medics were able to place in her right forearm, and the residents had scanned for central line, but she's got echogenic material or thrombotic material in her jugular veins under the trach collar, which suggests signs of central occlusion, most likely due to the Permacath and the AICD being in the chest together. She is contracted to the lower extremities, so we can't get into the femoral vein, and interventional radiology won't be open until Monday for some type of tunnel catheter. So what I wanted to ask you was – I had seen on the vascular blog, that clinicians are accessing the femoral vein in the mid thigh region with a long 55-cm catheter that terminates then in the inferior vena cava. So the way she's contracted is that one of her thighs is exposed, so I was able to scan her femoral vein that's about 4.5 cm deep, and it's a really big caliber vein. So if I was able to get you a 55-cm long triple-lumen catheter, would you allow us or be able to place this line? Because I don't know what other options we can do.

Dr. Nelson:

So there's a few different layers I try to think about with thinking about vascular access, and one of them is to put it into context of the patient's care altogether. So I think in this case, it would go without saying, but just in case anyone listening – in case this is their first thought, is that if the patient's goals of care are to move further with their care and engage with pressors, and engage with antibiotics, fluid resuscitation, et cetera, obviously that's one important thing. Sometimes patients who are very end-stage, very critical, and also have a vascular access issue, the vascular access issue isn't the only problem, but it can occasionally serve as a jumping-off point to speak with patients and family about their goals of care. So assuming in this case that kind of discussion happens, and that further intervention, including the approach to central venous access, is something that the patients or the caregivers, the healthcare proxy, et cetera, would want. Another layer of looking at this is, what is the patient need now, and what might they need later. In a perfect world, you'd want to access somebody one time and do it well and do it right and not have to get them stuck a million times. So we think about what kind of blood draws are they going to need. What type of fluid administration, pressors, medications that are somewhat noxious if they're delivered peripherally and might be better centrally like calcium or

potassium or that sort of thing. And the patient really has a lot of those needs. We might be able to get away with some things with that 22-gauge in the forearm that a heroic and enterprising person was able to get into her despite how challenging she was. And that means that an initial critical antibiotic could probably start to be delivered, and an initial fluid bolus could probably start to be delivered. So thinking about these options up front and even other options such as looking at intraosseous access for initial fluid resuscitation or initial access into the venous system to initiate the first round of medications. Does all of that sound reasonable to you as the first pass on this?

Mr. Ostroff:

Yeah, Dr. Nelson, everything that you say obviously as a former ER nurse, I completely agree. I think the challenge with this case arose due to the fact that we're not going to be able to get to the ICU for a long time. And due to that delay, what can we do in the meantime to provide her more reliable access? And can that even be done in the emergency room or considered to be done in the emergency department? Sometimes these hospitals can get so overwhelmed with patients that we essentially have an ICU in the emergency department. So I think emergency departments need to start coming up with options of how are we going to treat people in the ER as if they are admitted in our ICU? So I completely agree with your emergency approach of the IO and the peripheral, but when we're on hour 2 and hour 3 when that peripheral starts to go, and the intraosseous is only one line, you know, can we get that triple-lumen in? Can we use alternative methods in the emergency department? And I think we can.

Dr. Nelson:

Matt, I agree with you 100%, and that's why I sort of think about these things in phases. The initial resuscitation phase, critical access to the venous system, and what we can get out of that, and then thinking more definitively. One of our roles in the emergency department is to stabilize. And sometimes thinking about vascular access even in terms of stabilization means that we need to think about the next step, especially when we move to a situation where we are taking care of patients longer than we would typically expect. Stabilizing might mean that someone who has a tenuous airway gets intubated because we need to stabilize that process so we don't have to keep coming back to it over and over again, and someone is left with a tenuous airway. Someone might need pressors, and we would start a drip, and that's a pretty standard thing to do because giving push doses or giving intermittent boluses or what have you might not be a more stable solution for that person in the long term. And finally, with venous access, we might be able to get away with one line or another line or an intraosseous for a short period of time, but getting access to a more definitive way to stabilize this patient so we don't have to keep going back and rethinking this, and also so that the patient doesn't have to get stuck multiple times. Yes, I agree with you 100%, and it's just worth discussing now as we take a step-wise approach, and it sounds like we're on the same page that neither one of us starts thinking about central venous access without thinking through other options, and nor do we think about alternative routes to central venous access, or getting creative without looking at standard approaches first. And when I start to think about creative approaches, certainly we look at the standard approaches, right? Internal jugular, subclavian, femoral. We typically like lines above the diaphragm a bit better, and we like the infection rates, and complications rates of IJ or subclavian better than femoral in general. This patient, as you described, doesn't have good options above the diaphragm with echogenic material in the central venous system up there, as well as other foreign bodies in that area already. So at the risk of sounding cavalier about it, things were getting kind of crowded up there already, and especially if there's a future for this patient where there is any change in the AICD, if there's any change in the catheterization for their dialysis, I'd really like to leave those sites intact, and they're probably not good sites to begin with. So we start thinking about alternatives and getting into the femoral system is usually our second or third pass, and not being able to access the standard site around the inguinal ligament poses a challenge. So then we start to extrapolate, well, what do we already know about ways that people have accessed the IJ? And when I think about accessing the femoral vein through a more distal vein that leads to the common femoral vein, that leads to the inferior vena cava, to me that's analogous to using external jugular to internal jugular approach that you would use for an IJ central line. So there is some precedent for this and, as you note, there's some precedent for using a more peripheral femoral approach, as well, and that may serve several purposes; one, in some patients it's easier to access it physically because of their body positioning, like in this patient. And number two, it potentially gets you out of an area that's more easy to contaminate with urine or fecal material like being in the inguinal area, especially with a patient who's contracted, has an abnormal mental status, or

who has problems with toileting. So I think as long as you frame this in terms of the thought process of risk of thrombogenesis, risk of infection, risk of a complication of the procedure weighed against this patient really running out of other options, and then this starts to look like a much more attractive approach. And as long as careful sterile technique and careful Seldinger technique and careful approach to, you know, the needle guidance and ultrasound use, this would be, you know, a very reasonable option.

Mr. Ostroff:

Thanks, Dr. Nelson. These are the types of cases that I think in the emergency department we can really start to help these complicated patients with our vascular access teams and our attending physicians who have the access to, and the scope of practice to place these central type devices. I want to give you one other example that just happened on Friday, which I think you'll be interested in from an ER point of view. We had a patient come in that was on a long-term inotrope drip. Their PICC line they had since January had become malpositioned, and it actually went down the subclavian – to the subclavian region, and then it flipped up into the cephalic vein where it comes into the subclavian vein. It infiltrated, and she had a huge, large like mass in her shoulder area. She also had a left-sided pacemaker, and she walked. But she was going to be on obviously this inotrope for the rest of her life. So she's in the ER on a Friday night, and IR won't be open until Tuesday, so they would have to admit this patient for five days. But I was able to talk to the attending in the emergency department and ask, what if I tunnel like a Hickman catheter into her jugular vein down on her chest from the right jugular, would we be able to discharge this patient to home? And we were able to do that. So I think the scope of bedside options that could assist with discharges and expedited care haven't been really even thought about or examined just due to the fact that they haven't been tried yet. But I think we can implement advanced vascular access into the emergency realm. And I think it would just be really exciting to work together as a multidisciplinary practice between, you know, vascular access and nursing and the attendings to work on these complicated cases that we all have.

Dr. Nelson:

Well, I agree. And I think there are a few things that are really putting us into a very unique position right now in 2019. We've got increasing prevalence of vascular access teams of specialists, as you mentioned multidisciplinary, who are placing lines in people all day; easier lines, harder lines, lines above the diaphragm, lines below the diaphragm, central, peripheral, midline – every different option. So for a team like yours, which its primary function is to assess the best possible vascular access services for a patient, you're able to work with your multidisciplinary team at an incredibly high level to take the most challenging possible cases and get the most care possible efficiently and rapidly. But with the use of some of the newer catheters that we have and the ultrasound devices and more people being trained, that means that really every nurse, every technician in the country, every physician, NP, PA in the country should be able to place at least a peripheral I.V. in a patient that they previously wouldn't be able to, or place a central line in a patient that they previously wouldn't be able to. So I think these technologies have increased our ability to make hard patients easy, and impossible patients challenging.

Mr. Ostroff:

And I think the reason I was so excited to be having the case study discussion with you is because vascular access begins in the emergency department. And if that plan can begin there, where even if they stay with the peripheral, but the ER when they give reports, says, 'Look, this patient is going to need X, Y, and Z, let's get this plan in motion so that we can continue being able to provide the medications, the test, the procedures, having the patient have enough access for surgery,' it really begins in the ER. I hope that one day we have vascular specialists just work in the most critical area of the hospital, which is your emergency department, which is where I was trained. And I just want to thank you for reviewing these two, kind of examples, and to acknowledge that these challenges do exist, but that we actually have solutions now. And thank you for getting me on this path, and I hope we have a continued discussion in the future of how what other possibilities there possibly can be to improve what we're able to provide for patients.

Dr. Nelson:

Matt, thank you for so much for pioneering some of these techniques for your passion for giving the right patient the right tools at the right time. And thank you for all the work that you've done to spread the word, and all of your educational efforts, as well.

Mr. Ostroff:

Dr. Nelson, thank you so much for joining us today.

Dr. Nelson:

Matt, it is always a pleasure to speak with you. Thanks so much for having me.