Treating Dialysis Fistulas

Heramb Singh, MD, discusses his experience using pharmacomechanical thrombolysis with the Trellis device to treat thrombosed dialysis fistulas.

How did you initially begin treating thrombosed dialysis access shunts and fistulas? What training and proctoring was required?

I have been doing this for more than 15 years, starting with my interventional training at the University of Pittsburgh and my fellowship thereafter. When I finished my fellowship 20 years ago, these types of treatments were evolving, and as they evolved, I evolved with them. I did not go through a particular training program specifically to learn this procedure, but as new devices like Trellis (Covidien, Mansfield, MA) and AngioJet (Medrad Interventional, Indianola, PA) became available on the market, the interventional community was trying to figure out what would work best for treating our patients.

I tried many different techniques, and I believe that I have found what works best for me and for my patients, which is pharmacomechanical thrombolysis using the Trellis device.

Which members of your facility's staff are involved in the evaluation of patients and decision making regarding therapeutic options?

I receive consults from the nephrologists and the dialysis nurse when they have problems with a dialysis access. These problems usually include thrombosis of a fistula or shunt. Then I evaluate the fistula. The best method of evaluation is with fistulagraphy to see if the access is completely thrombosed or partially thrombosed. Based on this status, I decide which therapeutic option will be employed. During this process, I have an interventional nurse and interventional technologist assisting me. It is not a one-man show. I have a whole team of people working with me.

What are your criteria in evaluating candidates for pharmacomechanical thrombolysis? Which patients are ideal candidates, and which patients are not?

If the patient is not doing well on dialysis (ie, not getting sufficient blood return), I perform fistulagraphy. I administer a local anesthetic, place a small 6-F catheter and sheath, and inject dye to image the vessel. From there, I can evaluate the problem. Typically, imaging will show a partially or completely thrombosed fistula.

> "I have tried using many other devices in the past, but I have come to conclude that the Trellis works best."

How would you describe your technique for declotting thrombosed shunts and fistulas?

First, I document where the clot is—whether it is in the fistula or shunt or extending into the native vein (ie, the subclavian or basilic). Then I clean it out using pharmacomechanical thrombolysis with the Trellis device. During this process, I use two balloons with a wire inside that peaks at 3,000 rpm. We administer 10 mg of tissue plasminogen activator (tPA) for 10 minutes, which is the "pharmaco" portion of the pharmacomechanical thrombolysis, and then aspirate the clot and the tPA.

Which imaging modalities are ideal in these cases?

My patients are brought directly into the cath lab. I do not perform ultrasound or use any modalities found outside the lab in order to avoid unnecessary added cost to the patient. When the dialysis nurse and/or the nephrologist let me know that the access is not working well, I determine how severe the problem is while performing the procedure with a fistulagram or venogram with which we can see the anatomy and the problem area(s) and make a diagnosis fairly quickly. I believe that this is the gold-standard method of imaging for this procedure.

What has your experience with pharmacomechanical thrombolysis been to date? What are some of the advantages and disadvantages you see in declotting using this technology versus other modalities?

I have tried using many other devices in the past, but I have come to conclude that the Trellis works best. My measure of this is based on whether after using a device, the patient returns within a few weeks with problems, which, in my experience, is rarely the case with this device. It removes the acute thrombus and, at times,

> "Each case is unique; these are not just textbook cases with the same exact process over and over."

has also worked well on older thrombus. When you aspirate, you can see acute clot, which has a reddish tone, and chronic clot, which has a gray appearance, and it removes both types of clot well. With other devices that do not incorporate aspiration, clot can end up in the lungs and cause pulmonary embolism. This is especially problematic in cases when the patients have preexisting comorbidities. You do not want to compound any potential health concerns.

Another advantage is that instead of patients returning to my office within a few weeks or months, I have found that most patients have no need to return to my office for approximately 1 year or longer.

Overall, the more I use Trellis, the more I like it. However, one potential negative aspect is the cost, but I believe that the cost is justified because with other devices, patients have to return for follow-up visits more frequently. If they do not have to return for a long interval, this justifies the cost. Secondly, the procedure with Trellis can be somewhat time consuming. I think a lot of patients and interventionists want it done as quickly as possible, but by doing it so quickly, you might only remove the acute clot, thereby missing some residual, chronic clot.

Another point I would like to make is that once the thrombus is removed, there is usually an area of vessel narrowing, which requires balloon inflation and, occasionally, stenting. You have to clean the clot out, but you also have to treat the underlying problem. This is important to remember with all declotting procedures.

How is using PMT in dialysis access declotting different than in DVT cases?

It is the same technology, and the same principles apply: you place the balloons in the segment of the vessel that you want to work on (whether it is a leg clot, arm clot, fistula, or shunt), run the device, aspirate the clot, and then image the vessel to see if the clot has been cleared. I should note that I have never used > 20 mg of tPA for any application.

What medical regimens do you place the patient on before and after the procedure?

Because this is an outpatient procedure, I do not medicate patients beforehand, other than with some sedation. After the procedure, if stenting was performed, I recommend the patient be anticoagulated for 6 months.

How do you decide whether or not to place a stent/stent graft?

Stents are placed when the vessel does not respond to angioplasty. Stent grafts are used when there is leaking, hemorrhaging, or for treatment of an aneurysm.

What is your follow-up protocol (ie, junctures at which the patient comes back to the office and types of imaging used)?

Hopefully, the patient will not need to come back for a while, but the dialysis nurse and/or nephrologist will notify me if the patient is having problems again. Because they see the patient on a more consistent basis than I do, I can usually count on them to provide me with feedback on whether the procedure worked well or not. Occasionally, if the surgical anastomosis fistula is simply not done correctly, I will refer the patient for surgical revision.

Each case is unique; these are not just textbook cases with the same exact process over and over. Every patient's anatomy and the way the surgeon has created the shunt or fistula is a little different. That is why performing fistulagraphy will give you a good idea of what you are dealing with as far as knowing exactly where the problem is so that you can properly treat it.

Do you have any tips on managing patient expectations in this challenging population?

I am very straightforward with these patients. I tell them that the shunt or fistula has the possibility of failing at any time. It may last a day, a month, a year, or it may last forever. Sometimes blood pressure fluctuations affect it, or the patient may lie on the shunt and it occludes. Anything can cause it to fail again, including elevated blood pressure, infection, and many other causes. That is the main warning I give them about the procedure.

I also let them know that they can come to me if they are having any problems, and that way, I can do some touch-up work here and there instead of waiting for it to become a bigger problem. ■

Heramb Singh, MD, is with the Doctors Hospital of Laredo in Laredo, Texas. He has disclosed that he is a paid consultant to El Paso Vinton Diagnostic PA and Covidien. Dr. Singh may be reached at (915) 873-1455; heramb.singh@gmail.com.