Perspectives on Best Practices and Tips for Stent Retriever Use

An interview with Richard P. Klucznik, MD, on mechanical thrombectomy for stroke post-MR CLEAN.

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How would you describe your stepwise technique for extracting a clot using a stent retriever in a standard emergent large vessel occlusion (ELVO) case?

First, I prep a 9-F Cello balloon guide catheter (Medtronic, Inc.) on the back table in most cases. Procedurally, I start with a large-bore femoral sheath to allow me to use a variety of catheters, usually 9 F. I place a DAV catheter into the Cello and go to the affected artery. Once an ELVO is confirmed, I take a Velocity microcatheter (Penumbra, Inc.) and an 0.016-inch, 90°-tip Headliner microwire (MicroVention Terumo) and pass through the clot. Then, I bring up a Solitaire 4- X 20-mm (6- X 30-mm, if it is a T lesion) (Medtronic, Inc.). I leave that in place for 5 minutes, then inflate the balloon in the neck and slowly bring back the Solitaire. The flush is then turned off in the guiding catheter. Once the Solitaire is in the guide, I disconnect the flush, pull back the Solitaire until it is free, and take a large-bore syringe and suck the guide. If a clot is retrieved, I do a run to see if everything is now open.

If the clot has not been retrieved, I alter the next approach: I put the Velocity catheter through a 5Max Ace catheter (Penumbra, Inc.) and go up again. I place the Ace catheter up to the clot, put the Velocity through it, and then bring up the Solitaire again. This time, I initiate suction from the 5Max and pull the Solitaire into it (ie, the Solumbra technique). Most of the time, however, the clot is retrieved with one pass of the Solitaire through the balloon guide.

Which imaging modalities are you using and when?

We now have a simple algorithm, which is to use a noncontrast head CT to exclude hemorrhage. While the patient is on the table, we administer contrast and obtain a CT angiogram. If ELVO or a hyperdense middle cerebral artery is found via the noncontrast head CT, the patient is taken to the angiography suite. This speeds up the process immensely.

When you get to the interventional suite and the patient is on the table, what are the most important things for the prehospital medical personnel and the pretreatment team to have done?

Determining the National Institutes of Health Stroke Scale score. You would be amazed at how often it is not documented.

What is the most important tip you have learned and added to your technique since your first case?

While everyone else is getting the patient ready, I am prepping the balloon catheter and pulling the other catheters I need and placing them on the back table to be able to move quickly during the procedure.

Do you remember the moment you first learned of the favorable outcomes in MR CLEAN and what your initial reactions were?

I was skeptical at first because it was only a single study done in the Netherlands. It was only when the other studies confirmed the outcome that I really believed the data and foresaw the deluge that would take place.

How has your practice changed since the presentation and publication of MR CLEAN and the other contemporary interventional stroke trials?

Well, all of our stroke neurologists immediately became convinced, and one stroke neurologist went from a nonbeliever to a believer overnight. The floodgates have opened, and our volume markedly increased to the point that we now receive calls at 3 AM. That part is not so great; I'd rather keep the strokes from 7 AM to 5 PM.

How have these data changed your ability to present your program's capabilities to other departments in your hospital and other hospitals in your region that do not have dedicated stroke resources?

We have always been a comprehensive stroke center. We have been on multiple trials including PROACT, but we are now getting more patients from outside hospitals that previously only gave tissue plasminogen activator.

What about patients and the community?

There is now an extensive community outreach program aimed at getting the word out. It starts with a seemingly little thing: A small ER has a patient come in with ELVO. The hospital does not have a helicopter pad, so they call the fire department to close a street so the helicopter can land, but the firefighters refuse because they have not heard of this before. So, there is quite a bit of work to reach out to EMS, fire, police, and anyone involved, which can impact time and patient care to get to the most comprehensive center available.

What are some of the most challenging cases you encounter from an anatomic standpoint?

I have had a 101-year-old patient with a tortuous arch and difficult anatomy who required catheter exchanges and stiff wires, but the procedure was successful, and she actually did very well. In another challenging case, the access was very tortuous, and the patient was so tall that the catheter could not reach the clot.

Do you feel the current American Heart Association/American Stroke Association guidelines are sufficient? How do these compare to your own decision making and thresholds for mechanical clot extraction?

I do not agree with the way they came out with their guidelines, as they did not work closely enough with the Society of NeuroInterventional Surgery. The guidelines should state mechanical thrombectomy, as there are alternatives to stent retrievers that are having great success, and new devices are coming. I think it was too early for these guidelines to be so specific. They compare to my own decision making in that I routinely use stent retrievers.

What is one capability you would like to see in the next generation of stent retrievers?

One that I believe is already in development is a covering that would go over a stent retriever like a condom to prevent the clot from dislodging as it is being withdrawn, which can lead to embolic material to a new territory. ■