GAINING ACCESS

The Transradial Approach

***Cath Lab Digest* talks with Jeffrey Popma, MD, FACC, FSCAI, Director, Innovations in Interventional Cardiology; Senior Attending Physician, Beth Israel Deaconess Medical Center; Associate Professor of Medicine, Harvard Medical School, Boston, Massachusetts, about his use of and experience with the transradial approach.**

How did you come to use the transradial approach?

About fifteen years ago, I was invited to a transradial session in Amsterdam, taught by Ferdinand Kiemeneij. It was a live demonstration course and I was in the audience as a femoral interventionalist, surrounded by people that were very enthusiastic about the radial approach. I watched as a dockworker from Rotterdam walked into the lab and extended his wrist. Dr. Kiemeneij brilliantly used the transradial approach to perform coronary angiography followed by stenting of the right coronary artery. Within about 20 minutes, the patient was sitting up and drinking a cup of coffee with his left hand, having never taken off his pants or unbuttoned his belt. One of the operators in the audience asked what the indications were for doing the radial artery approach from the left arm rather than the right arm. The answer was, "If the patient wants to drink his coffee with his right hand, then go from the left side!" The audience was quite impressed with the simplicity of this approach.

So fifteen years ago, the concept of truly "outpatient" angioplasty was born, using the radial approach, with patients sitting upright immediately after the procedure and being discharged from the hospital a few hours later. The challenge was that in the mid-1990s, many U.S. interventionalists were using larger — not smaller —guiding catheters in most patients due to the widespread use of rotational atherectomy, directional atherectomy and coronary stenting, which, at that time, required the use of 8-10 Fr guiding catheters. But the Europeans soon learned that "smaller was better," and with the availability of lower-profile coronary stents, transradial access was performed in many centers for the majority of cases. A particularly memorable case was broadcast to the Transcatheter Cardiovascular Therapeutics (TCT) by Dr. Jean Fajadet from Toulouse, France. The patient was a young man with critical left main stenosis. Dr. Fajadet used the transradial approach and placed a stent effortlessly in the left main. The angiographic result was spectacular, and, at the end of the case, the patient sat up, waved to the audience, and then walked out of the room.

Of course, these procedures were performed at that time by the most skilled operators in Europe. In some laboratories, transradial access was used in 80 and 90% of patients. In the U.S., there was a bit slower uptake, for a number of different reasons. The major limitation was that transradial access required a bit more technical proficiency than the transfemoral approach. There was a recognized "learning curve," but in retrospect, it was really not so hard to get started.

In early 2000, two of my former partners at Brigham and Women's Hospital, Dr. Dan Simon and Dr. Campbell Rogers, spent three days with Dr. Barbeau learning the technique of transradial access. More importantly, they learned what the entire catheterization laboratory team needed to do to become proficient with transradial access, from the patient prep to the patient discharge. My partners returned to Boston tremendously enthusiastic about transradial intervention. Of course, not to be outshone by my younger colleagues, I too adopted the transradial approach, particularly in patients with co- morbidities that made the transradial approach somewhat risky. Eventually, I found I was getting many referrals for patients where the transradial approach would be preferred. The mother of one of my referring physicians had extremely severe peripheral vascular disease and unstable angina. Her only access was the right radial artery. We ultimately placed a drug-eluting stent through a 5 Fr deeply seated guiding catheter in the left anterior descending coronary artery (LAD) via the transradial approach. The procedure was a success and the patient was very pleased that she could ambulate immediately after the procedure. And, of course, her son was very pleased with us as well.

I think it is well recognized that transradial access is much less debilitating than the transfemoral approach

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in patients who need coronary angiography and intervention.

In 2009, we have a tremendous supporting body of clinical evidence from randomized data and personal experience that shows that when transradial access is used, the bleeding complication rate is less than using a transfemoral approach. We now recognize that bleeding is an important contributor to mortality after coronary stenting.

There are many centers in the U.S. that perform selective radial access and intervention, most often in patients with absolute or relative contraindications to femoral artery access, such as very obese patients, patients who have severe iliofemoral disease, aortic aneurysms, or anatomic or orthopedic disabilities that make it difficult to lie completely flat. We have found that procedural success rates in these patients are extremely high, and that up to 20% of patients will have one or more of the indications for doing the radial approach.

Other U.S. centers perform more than 90% of their cases via the transradial approach. These centers have dedicated physicians and teams in the cath lab that have learned that patient flow and logistics are much improved when the patients are treated with the transradial approach. Post-operatively, rather than having gurneys and beds, the recovery room has plenty of chairs so the patients can sit up after the procedure has been completed. Patients are actually ambulatory immediately after the procedure, even if a coronary intervention has been performed.

Looking toward the future in 2012 or 2013, I think we will see more transradial cardiac catheterizations being performed. For elective procedures, trends in reimbursement patterns suggest that more interventional procedures will be considered as "outpatient" procedures, necessitating early hospital discharge. It is clear that the resources needed to perform transradial intervention are less than with a transfemoral approach, potentially allowing earlier hospital discharge. In a setting of declining reimbursements, we need to think about how best to optimize the resources we do have. The transradial approach can probably be performed at less cost and importantly, it is safer, with lower bleeding complications. If I were going to predict where we are going to go over the next couple years, it's going to be toward a greater number of transradial access procedures. I think physicians will embrace this, particularly as they gain more experience.

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How can physicians be encouraged to adopt this procedure?

I believe that hospitals should be aware of the potential advantages of the transradial approach and each center should identify one or more clinical site proponents. There will be overall success for the institution even if only one or two physicians bring the program forward. The word will spread and more patients would like to be treated using transradial intervention.

What do staff do to help in a transradial procedure?

The workup is very important in patients undergoing transradial access. Here are a few useful tips for the staff:

- Perform a complete history and physical, including an evaluation of the pulses in the leg. Make sure that there is no differential in the arm blood pressures that might suggest subclavian or innominate stenosis.
- Perform ankle-brachial indices in both legs to assess the presence of peripheral vascular disease.
- Ensure that the IV or the name band is not placed on the wrist that is selected for radial artery access.
- Be prepared to cross over to the femoral technique, if needed. Although this occurs in less than 5-10% of patients, the suitability of femoral artery access should be assessed. The groin should have ready access for prepping and puncture, if needed.
- Perform Allen tests on both wrists. Although the right wrist is usually preferred due to its location on the right side of the table, closest to the operator, transradial access can generally be performed from either wrist. Importantly, cardiac surgeons occasionally use the radial artery as a conduit and the left (nondominant) hand is generally reserved for harvesting.
- Position the table so that the advancement of the wire can be done using fluoroscopy.
- During the prep of the patient, prepare for removing the sheath by hyperflexing the wrist with a little bit of gauze pad, making sure the wrist is hyperflexed at the time the physician goes in.

If someone wants to learn the transradial approach, what do you recommend?

It's best to have an experienced operator walk the interventionalist through the first couple of cases. After

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50 to 100 cases, you become relatively proficient in the more complex patients. The only error might be in simply taking the hardest patient you can possibly think of and doing that patient first. Generally, the best way to learn is on healthier arteries, so first do some routine diagnostic catheterizations. Use transradial access and make sure that there is no resistance when advancing the guidewire or catheters to the central aorta.

For a skilled interventionalist, moving from diagnostic angiography to a percutaneous interventional procedure is a relatively quick transition. It doesn't take much additional skill, because once a guiding catheter goes up, then the intervention proceeds the same as it would with femoral access. One difference is that one may need to be more aggressive with the guiding catheter position, by deep seating the guiding catheter to provide adequate support. Importantly, the guiding catheters are very nontraumatic and flexible. We use a little more aggressive guide catheter positioning when we do the transradial approach.

Any final considerations?

In the post procedural area, the real benefit is a reduction in bleeding complications and early ambulation. However, I think that patient comfort is one of the major reasons why, for the long term, radial access is going to be very useful approach. ■

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