

Pharmacologic Considerations When Switching From Femoral to Radial

Duane Pinto, MD, MPH, shares his insight on how changing from femoral to radial access might affect your pharmacologic choices at your institution.

What is your preferred access route (radial or femoral) for percutaneous coronary intervention (PCI), and why?

Dr. Pinto: Radial is my preferred method of access, mainly because the outcomes are better. There are numerous clinical trials that have shown a benefit with regard to not only access site bleeding, but also with regard to clinical outcomes, including survival. Although many interventionists may dispute the magnitude of effect with regard to utilization of radial versus femoral access, I think this is an important association. The other benefits of radial access include throughput in the catheterization laboratory, as well as, very importantly, patient comfort.

Are there enough existing clinical data supporting the use of radial PCI over femoral? What do the data show?

Dr. Pinto: In my opinion, the answer is yes. Numerous studies have shown that radial is superior to femoral, and this has been shown time and again in both randomized studies as well as meta-analyses. I will say that everybody believes that they are better than everyone else at what they do, or that their practice is somehow different from those in clinical trials, or that femoral operators were not really represented as best practice femoral operators in the trials or vice versa. I think that we have to really be willing to look in the mirror and ask if we really are pursuing best practice methodologies when it comes to arterial access. If we really think we're doing the best that we can, then a reasonable person could disagree with the results of the

randomized trials. Nonetheless, the results are as reported, and I believe that significant reductions in access site bleeding are likely to be of some benefit with regard to clinical outcomes, particularly in sicker patients.

What are the most common complications associated with using the radial approach?

Dr. Pinto: The most common complication is failure of the operator to achieve access and complete the procedure in a timely fashion. That complication, if you really want to call it a complication, diminishes with experience. The next most common complication for the patient is pain at the access site because we're manipulating a smaller artery. There are also other worrisome complications, such as hematomas, vessel perforations, and dissections; however, those complications are uncommon and manifest differently than with femoral access (ie, similar types of complications, but much more infrequent compared with femoral access).

Who is the optimal patient for radial access PCI? Are there other patients in whom radial access is not feasible?

Dr. Pinto: The optimal type of patient for radial access PCI is one whom you want to have a good outcome. So, if we really do believe the data, radial access should be our default for most circumstances. There is a gradient of effect such that the sicker the patient, the more likely there is to be a larger benefit. This must be modified by the experience and technical ability of the operator. Specifically, some patients may be so urgently ill or have such complex anatomy that operators may believe that

they have exceeded their ability to do the case safely from a radial approach. An idea that sicker patients may benefit more from radial access may be counterintuitive to some interventionists who may believe that the femoral approach may be preferred in the older or sicker patient for a variety of reasons. However, my opinion is that those are the exact patients in whom we should be using bleeding-avoidance strategies. I think what we should really be asking is, “Are there patients in whom femoral access may be preferred?” Obviously, there are patients who have already had their radial arteries used for bypass, so it’s just not possible to use a radial artery. There are also patients who have suffered complications from previous radial access, and that might be a relative contraindication.

One patient population in which I might prefer femoral access is in patients in cardiac arrest or those with very severe shock in whom I might want to use a circulatory assist device. In such cases, I might move to femoral access initially rather than radial access, but it is with the idea that if I need another access, I would be utilizing radial access. The reason is that if I place a circulatory assist device, and the remainder of my procedure is completed radially, I don’t have to interrupt anticoagulation. I can apply the compression device and manage the patient very rapidly with a circulatory assist device that could not be placed in the radial artery.

Do you believe that radial access PCI results in a shorter length of stay for patients, and are there financial benefits of radial access PCI over femoral?

Dr. Pinto: I do think that radial access PCI results in a shorter duration of hospital stay compared with femoral access. That has been shown in a variety of analyses. What I will say is that the difference is generally related to process. As physicians, we decide how many hours of observation are needed and whether we will discharge a patient the same day after PCI. I think that traditions determining how long we observe the patient probably play a greater role in length of stay than the choice of access site. Frankly, if we decided we want to observe the patient for 4 hours after PCI, it would almost be irrelevant whether we used femoral access with a closure device versus radial access.

Now, the difference that may prolong their hospital stay relates to complications. If we found in our patient population that radial access led to fewer bleeding complications, then we would be discharging those patients faster. But, when it comes to the elective PCI population, that’s not really going to be the case, because bleeding complication rates are so low across the board.

When it comes to an ST-elevation myocardial infarction (STEMI), non-STEMI, or acute coronary syndrome (ACS) patient population, I’m not sure that a minor bleeding complication during hospitalization is going to make a substantial difference in a hospitalization that is 2 or 3 days anyway. Nonetheless, I do think that with regard to throughput and the use of staff, radial access PCI is much less resource intensive; it is important to understand the distinction to be made between the length of stay versus resource utilization.

The majority of PCIs in the United States continue to utilize femoral access, yet the rest of the world primarily has a radial-first strategy, with some exceptions. What is the reason for this?

Dr. Pinto: Just as every culture in Europe is actually very different despite the fact that they’re all part of the European Union, the rates of radial PCI are very different throughout Europe as well. As Americans, we like to say, “Oh, Europeans, they use radial.” But the truth is, it’s largely a training and cultural issue, and I think we’re starting to see the inflection point in the United States where trainees are far more comfortable with radial access and know the benefits of radial access over femoral access. Actually, we’re currently training a radial-first generation. We’re going to see that play out in the next couple of years.

For example, the French trained the radial-first generation a while ago, and that’s why they practice the way they do, whereas other countries that have very high rates of femoral utilization have not trained the next generation. What does concern me a bit is that I am in a “sweet spot” where I trained in both, and that’s why I can apply both strategies when I think one strategy is optimal over the other. But, I do think we’re going to have a generation of folks who are going to feel more reluctant to use femoral access. If we were to discuss this again in 10 years, the whole conversation might be about why we don’t use the femoral approach anymore and why people are less adept at using large-bore femoral access.

If a cath lab is interested in moving from the femoral approach to the radial approach, what is your recommendation on how to set this up?

Dr. Pinto: Well, like everything that requires change, you need somebody to carry the torch. Initially, people are pretty complacent with their practice and outcomes and don’t want to rock the boat or change. Switching to radial requires a substantial expenditure of energy and time. One has to actually become less efficient before the practice can become more efficient. Staff—from the nurses and the techs to those ordering the equipment—have

to gain familiarity with the radial approach. They have to understand that there are some slight differences in patient preparation and performance of the procedure, and with everybody learning something new, you need to have one person to keep them all on task and to remind them why the change is occurring. But, like all new endeavors, in short order, there comes a time when everyone will realize that the new protocol is working, and then it becomes normal.

That was the experience in our laboratory when we converted from a largely femoral laboratory to one that now uses radial access 70% to 80% of the time. At first, we were exasperated by having to perform a radial case, and it took longer to do. Now, it's as efficient, if not more so, to do a radial case, and we don't think twice about it. Everyone can see that the patients are happier, and the holding area nurses see that they can spend more time with the patients on other aspects of their care (eg, education). They can have more time to actually explain some other aspects of the patient's care to him or her rather than spending that time holding a sheath or maintaining pressure on a hematoma.

Do you believe that radial access PCI allows the operator to use more aggressive antiplatelet therapy, especially in the high-risk ACS patient population? If so, which patients would benefit from a more aggressive antiplatelet regimen?

Dr. Pinto: I think that in the operator's mind, using radial access nearly eliminates the worry about life-threatening access site complications. We don't think that radial access should prevent all bleeding, so that's still a consideration. However, with regard to the idea that many of our patients are inadequately preloaded with oral antiplatelet agents or may benefit from more potent antiplatelet agents because they're ACS patients, we feel confident that the risk of a bleeding complication is, in most cases, offset by the advantage of avoiding recurrent myocardial infarction once we've taken access-site bleeding out of the equation.

The guidelines suggest that we should be using glycoprotein IIb/IIIa inhibitors when patients have not had adequate pretreatment. I'm actually quite a fan of this, especially in circumstances when we have not had time to get appropriate oral antiplatelet therapy onboard, such as those who present emergently to the catheterization laboratory (eg, ACS patients, and in particular, STEMI patients). I like the idea of having this therapy available to me because I am not as concerned about access-site bleeding, especially if I have to bail out to add a glycoprotein IIb/IIIa inhibitor or if I believe

the patient has been inadequately covered with regard to oral antiplatelet therapy. I'll certainly feel more confident because I'm using a radial approach.

What is your hospital's preferred glycoprotein IIb/IIIa inhibitor and why?

Dr. Pinto: Our hospital's preferred glycoprotein IIb/IIIa inhibitor is tirofiban. We have moved on from other agents because of cost considerations and the fact that a high-dose bolus regimen for a short duration of infusion is provided at low cost. We have been reassured by data indicating that the high-dose regimen for this agent has addressed previous concerns regarding inadequate bolus dosing.

Given that glycoprotein IIb/IIIa inhibitors are potent inhibitors of platelet aggregation, what other strategies outside of radial access do you employ to mitigate the possible bleeding risks?

Dr. Pinto: The primary strategy that we use is to reduce the duration of infusion. The other is to avoid the utilization of other anticoagulants unless and until we have to. For example, in patients with atrial fibrillation who require warfarin, we may not actually bridge them with heparin, and we initiate the warfarin a little later in the course of treatment. Similarly, during follow-up, a lot of physicians in our group are discontinuing the aspirin in patients who require triple therapy as was evaluated in the WOEST study. I think we will see more in this area as different combinations are evaluated, including novel anticoagulants at lower doses with various combinations of antiplatelet medications.

Which is your preferred anticoagulant when using the radial approach: heparin or bivalirudin?

Dr. Pinto: It depends on the patient's circumstance. I use heparin for all of my radial patients at the time of access. If I go on to PCI, I tend to use bivalirudin for my ACS patients who have been adequately preloaded. I tend to use a bolus of glycoprotein IIb/IIIa inhibitors for patients who have been inadequately preloaded, which is generally on the background of heparin, especially in STEMI patients in whom I want to make sure that adequate antiplatelet therapy has been administered. ■

Duane Pinto, MD, MPH, is Associate Professor of Medicine, Harvard Medical School; Associate Director, Interventional Cardiology Section; Director, Cardiac Intensive Care Unit, Beth Israel Deaconess Medical Center in Boston, Massachusetts. He has disclosed that he is a consultant for the Medicines Company, Medtronic, Medtronic, Abiomed, Janssen, St. Jude Medical, and Abbott Vascular. Dr. Pinto may be reached at (617) 632-9210; dpinto@bidmc.harvard.edu.