

Transradial Access for PCI

Should the femoral approach for percutaneous intervention remain the gold standard?

BY RAMON QUESADA, MD

Bleeding is one of the main predictors of morbidity and mortality after percutaneous peripheral and coronary intervention (PCI). Although often underappreciated, the major cause of bleeding is related to femoral access site complications; retroperitoneal bleeding can be life-threatening. In order to avoid that complication, it is important to be careful with the location of the femoral arteriotomy. However, the use of transradial access eliminates the access risk and can be used for all types of interventional procedures, once the technique is mastered. In the US, the incidence of radial access for PCI is very low—less than 2% by some estimates.¹ Although the femoral technique is the gold standard in the US, there is strong evidence that we should follow our global colleagues' lead in this area.

Studies have shown the following significant rewards of transradial access for PCI:

- Decreased incidence of major entry site complications, especially bleeding.
- Easier vascular access and hemostasis in obese patients.
- Decreased time to ambulate and discharge.
- Decreased postprocedural cost.
- Improved patient movement.

I began employing the radial approach in 1998 by using it in diagnostic procedures. In the first 4 years, I utilized the radial approach in more than 1,100 procedures; one-third of these were interventions. My conversion to femoral access was less than 10% during that time frame. Since then, I have certainly become a convert to the radial approach and have now used it in more than 4,000 cases, including ST segment elevation myocardial infarction (STEMI) interventions and chronic total occlusions. Based on this experience, I believe that 75% of all interventional cardiology patients would be viable candidates for the transradial approach.

The radial technique was first explored 20 years ago, and interventionists began using it in interventional procedures more than 15 years ago. Given the option,

most patients would clearly prefer it. So why is it not more widely available? The main barriers include a learning curve, a deficiency in training opportunities, and the lack of economic incentive due to reimbursement issues. Once they master the technique, however, many cardiac interventionists prefer to use it as the initial approach.

FEMORAL VERSUS RADIAL

The femoral approach for percutaneous coronary and peripheral interventions has been the gold standard for 40 years. It has enabled a multitude of vascular procedures to be performed in a minimally invasive manner, rather than through open surgical techniques, and therefore has significantly reduced the incidence of complications. Yet, entry site complications, including bleeding and femoral nerve damage remain small but significant problems, affecting 2.8% of procedures.² Renal failure, sepsis, and death are worst-case scenarios.

Entry site complications can stem from a number of risk factors. Not surprisingly, many of these patients have significant peripheral arterial disease (PAD), which com-



Figure 1. HemoBand (HemoBand Corporation, Portland, OR) is used for compression.

plicates access. In particular, overweight patients present a challenge because it is often difficult to locate and safely access the femoral artery. Postprocedure compression can be difficult in overweight patients as well. This is further complicated by the use of anticoagulants and antiplatelets to avoid procedural clotting. Retroperitoneal bleeds can occur and often go unnoticed. These patients may be discharged and then later readmitted, needing a transfusion.

After femoral access, many patients complain of leg pain at the access site. The fact that they must lie flat on their backs for 2 to 3 hours if expensive closure devices are used, or for 4 to 6 hours if they are not, is inconvenient at the least and can cause back pain, particularly in older patients.

Radial access avoids many of those problems, resulting in an entry site complication rate of only 0.3%. Because the radial artery is so close to the surface, access is not a problem even in obese patients. Postprocedure compression takes approximately 15 to 30 minutes via a pressure bandage, and hemostasis is quickly achieved. The operator is then free to use adequate antiplatelet therapy because there is a low risk of bleeding. If there is bleeding, it is then easy to assess and stop (Figure 1).

Nerve damage is unlikely because the radial artery is not close to a major nerve. Radial access patients can sit up after the procedure and walk almost immediately. Some patients are even able to avoid spending the night in the hospital.

THE EVIDENCE IN FAVOR OF TRANSRADIAL ACCESS

Proof of the advantages of radial access for PCI tends to confirm the anecdotal evidence. A recent study based on 593,094 procedures found the incidence of bleeding was reduced by 58% when the radial approach was used, compared to when the femoral approach was used.¹ The gains were even greater for many higher-risk patients. Women undergoing radial access PCI experienced 62% less bleeding, and patients with acute coronary syndrome had 61% less bleeding. Patients aged 75 years or younger experienced 69% less bleeding, and even those older than 75 years had 29% less bleeding.

Furthermore, a Canadian study of 38,872 procedures found radial access was associated with 50% fewer blood transfusions, and consequentially, there was a significant reduction in 30-day and 1-year mortality rates.³ In a meta-

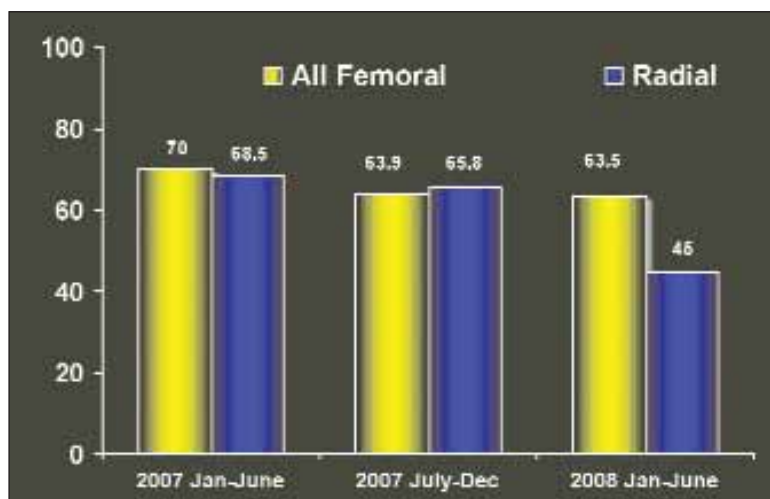


Figure 2. STEMI: mean door-to-balloon time in minutes comparing the femoral versus transradial approach.

analysis of 11 randomized trials comparing entry site complications of the radial approach versus the femoral approach for percutaneous coronary diagnostic and interventional procedures, the radial approach was favored in all but one trial, which was neutral.² In my experience, use of the transradial approach in STEMI cases is not only feasible, but it is possible to treat the patient as quickly as when using the standard femoral approach (Figure 2).

RADIAL ACCESS IS NOT FOR EVERYONE

There are some valid concerns about the radial approach. Smaller arteries are more difficult to traverse and more likely to spasm, however, this issue can be managed with medications. Also, larger devices can be difficult to advance to the treatment site. Due to the requirement of special catheter shapes for coronary cannulation, there is a learning curve for more inexperienced operators. There is a limited compatibility with larger (>2 mm) rotoblator burrs. It can be a challenge to treat elderly, hypertensive patients who may have increased tortuosity of the radial and subclavian arteries, which necessitates stiffer guidewires.

However, there is only one true contraindication to radial access for PCI—an abnormal result of an Allen's test. The success of the radial approach relies on the dual blood supply to the hand via the radial and ulnar arteries. Both arteries should be fully functioning to avoid the possibility of hand ischemia in the case of prolonged radial artery occlusion. In the presence of an abnormal Allen's test result, the femoral approach is preferred, unless the risk for that approach is even greater as in the case of patients with severe PAD, morbid obesity, or a large abdominal aortic aneurysm.

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TECHNIQUES

I have found that ideal candidates for transradial access include 90% of people with dual circulation to the hand, obese patients who are at an increased risk of complications from transfemoral access, and those with severe PAD. Although the risk of entry site complications is higher for the femoral approach, the risk of procedural failure is higher for the radial approach (7.3% vs 2.4% on average for the femoral technique).²

THE FUTURE OF PCI ACCESS

Much of the cause for procedural failure of the radial approach is associated with the need for higher technical skills and the difficulty in using femoral catheters in the smaller radial artery. There is a learning curve, and many interventionists are uncomfortable attempting a more technically challenging procedure. Unfortunately, most medical schools and fellowship programs have yet to incorporate the technique into their training programs.

Nevertheless, it is a procedure that can be taught, and the number of radial access training programs is growing. Computer simulation models are also being developed. Lectures, didactic sessions, and courses are being offered, such as the recent session at the International Symposium on Endovascular Therapy (ISET) in Hollywood, Florida. Additionally, catheters are becoming thinner and more maneuverable, and stents are increasingly lower profile.

It has been shown that radial access virtually eliminates local vascular complications and that it is a safe alternative to femoral access. As more interventionists are adequately trained in the technique, and with the innovation of new catheters and devices made specifically for radial approach, it may become easier to adopt. I am seeing a clear trend toward equalization of the two procedures. The radial access approach will likely never replace the femoral approach, particularly for peripheral procedures, but it is not out of the question that it may someday share gold standard status. ■

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