

# Radial Access in Peripheral Interventions

*Endovascular Today* interviews Craig M. Walker, MD, about the potential advantages of taking an “access road less traveled.”

**Endovascular Today:** *The femoral artery is by far the most frequently used access point for both peripheral and coronary procedures. However, sometimes femoral access is not possible due to anatomical reasons and the patient's condition. In which patients should radial access be considered?*

**Dr. Walker:** There are several types of patients in whom radial access should be considered and several in whom it should never be considered. Radial access is ideal in patients who are on anticoagulation in whom we do not want to reverse the anticoagulation—for instance, patients who have atrial fibrillation or prosthetic valves. When a procedure is performed via the radial approach, the patient can be kept on full anticoagulation without changing anything, which really shortens the hospital stay. This results in very little risk of the patient bleeding because we have such good control capability over the radial artery. Second, occasionally there are patients in whom we cannot palpate a femoral pulse nor feel the brachial pulse. If we want to access these patients percutaneously, the radial artery, even when we cannot feel it, typically lies in a given anatomical area. Therefore, we can often access it even when we do not feel a distal pulse. In fact, there have been cases in which a patient's aorta and grafts were occluded, in whom I could not feel a brachial or an axillary pulse. This occurred because the patient had an occluded subclavian artery, an occluded brachial artery, and had been accessed many other times. In this patient, I was able to stick the radial artery, dilate the brachial and the subclavian arteries, and complete revascularization of the leg from the radial access site. There are some cases in which the radial artery is the only site from which we can access.

There are some cases where lesions can be crossed and treated more easily when approached from above. If there are vessels coming off of the aorta that have an aggressive inferior path, those vessels are typically better accessed from above rather than from below. In such cases, radial access works fairly nicely.

Radial artery access is a poor choice if the ulnar artery is occluded, because this may precipitate hand ischemia. Radial artery access is also a poor choice in cases of very small radial arteries if one needs a larger sheath to deliver the intended care or intervention (ie, a stent). There is the potential to injure the radial artery in such cases. In patients requiring the use of the radial artery as a bypass conduit, radial procedures should be avoided. There are some cases in which the radial artery is simply too far away to be able to deliver therapy. In a patient who has disease at the level of the knees or below, even with the longest currently available interventional devices, we simply cannot reach those areas from a radial approach.

**Endovascular Today:** *In which endovascular procedures and lesion locations might radial access prove advantageous?*

**Dr. Walker:** It is a very nice approach for brachial, subclavian, and axillary artery stenoses because of its location. Occasionally, radial access is useful in internal mammary artery lesions. It is also useful in vertebral artery lesions, as well as renal, celiac, and superior and inferior mesenteric artery lesions. There are also instances of utility in iliac artery stenoses.

**Endovascular Today:** *What are the potential advantages of radial access over other options?*

**Dr. Walker:** The big advantage is that we can access it when no pulse can be felt. Also, we do not have to reverse anticoagulation; therefore, there is a decreased risk of bleeding or thrombotic complications.

**Endovascular Today:** *What advantage does the radial artery have over a percutaneous brachial approach?*

**Dr. Walker:** The radial artery typically lies in an anatomic area that is felt more reliably than in the brachial artery, even when one detects no pulse. The brachial artery can be a little difficult to find—certainly, when there is no pulse and the brachial artery is deep and very difficult to access. That is not always the case

with a radial artery. Frequently, when there is no brachial pulse, there will still be a radial pulse. This has to do with Fournier resonance because there is systolic amplification of pressures the farther out one goes in the vascular system. We can often feel that pressure because there is a higher systolic peak than the more central brachial artery. The radial artery lies in a more consistent anatomical space.

Also from a radial access, we are actually able to dilate brachial stenoses when they are present. Also, with radial access, anticoagulation is not an issue, which is not true in a brachial access. If a patient is already on warfarin for prosthetic valves or atrial fibrillation, when using a radial approach, you would simply leave those patients on those medications, perform the procedure, and nothing would change. This is not possible from the brachial access, which would bleed the same way as the femoral access would bleed. That patient would have to be taken off warfarin, transferred to heparin, the procedure performed, hopefully hemostasis achieved, and warfarin restarted—a process that can be very difficult and tedious.

An advantage of the brachial artery is that it occasionally allows for placement of larger sheaths, and it is approximately 15 cm to 20 cm closer to the central vascular system than the radial. Therefore, in certain cases, it is possible to reach areas with brachial access that cannot be reached with radial artery access.

**Endovascular Today:** *Approximately what percentage of your patients is treated via this approach?*

**Dr. Walker:** Approximately 4% of our patients are accessed via the radial approach. It is not a high percentage because often are using large devices and are working in the infrapopliteal space. The radial artery is too far away from the infrapopliteal space to deliver therapy, and I do not like to use sheaths larger than 6 F in the radial artery.

**Endovascular Today:** *Are there differences in the size of sheaths that you would put in a male versus a female?*

**Dr. Walker:** It is not really so much about male patients versus female patients; it is based on the size of the patient's arteries. Typically, male patients have larger vessels than female patients, as a general rule. Of course, there are exceptions to this.

**Endovascular Today:** *How would you describe the prevalence of the use of radial access in the US?*

**Dr. Walker:** I think it remains a small percentage overall. It is new, and there is always the element of change. Sometimes we would like to be able to use larger

catheters and sheaths, and one is limited in the size of devices available for use in radial access. It is difficult to use a sheath size that is much larger than 6 F. There is the issue of the radial artery as a conduit; many surgeons like to use the radial artery as a surgical conduit. In those cases, there can be issues. Also, it may be more difficult to manipulate the catheter in the radial artery. However, radial artery access can be a good access in patients. It can frequently be a more comfortable access to the patient. Radial artery access is used relatively sparingly in practices across the US.

**Endovascular Today:** *What have been the barriers to more widespread acceptance?*

**Dr. Walker:** First, people are very comfortable with other approaches. Second, we now have vascular closure devices for other approaches, which have improved those approaches and reduced the rates of bleeding complications in those other areas. Third, the distance of the radial artery from certain types of lesions can be a problem. However, I do think we are seeing its acceptance slowly increase across the entire country. There are few products made specifically for the radial approach, but Terumo Interventional Systems (Somerset, NJ) and other companies have started to change this.

**Endovascular Today:** *What are the best means of learning how to perform radial access?*

**Dr. Walker:** At first, one needs to study the anatomy of the radial artery. One then needs to observe how radial artery punctures are performed, typically, using micropuncture technique. Administering an anticoagulant to protect against thrombus and antispasmodic drugs is crucial. One must understand how to perform the appropriate testing to ensure that there is no ulnar blockage, which could render the hand ischemic if the radial artery is accessed. Short of that, radial artery access is something that an experienced interventionist can learn rather quickly.

**Endovascular Today:** *Does simulation play a role in radial artery access training?*

**Dr. Walker:** It probably could. Certainly, most of us who have learned radial access did not learn on simulators. We learned by studying the anatomy and working with a proctor. Radial access is a reasonably easy technique to learn, at least in gaining access. Catheter manipulation can be challenging.

**Endovascular Today:** *A study last year reported intimal damage identified up to 1 year later by duplex ultrasound. Is this a concern?*

**Dr. Walker:** This is definitely a concern, especially if the

# ENDOVASCULAR TODAY

## SUBMISSION GUIDELINES

If you would like to submit an article for publication in *Endovascular Today*, first query in writing with an outline of your proposed article.

**Editorial Policies.** All articles published in *Endovascular Today* are reviewed by Members of our Editorial Advisory Board and Editor-in-Chief, who have sole discretion to accept, reject, or edit any article submitted for consideration. All articles must be original and must not have been published elsewhere.

**Format.** We accept manuscripts in Microsoft Word format. Drafts should be e-mailed to the Editor-in-Chief.

**Deadlines.** All assigned work must be submitted by the first day of the month, 2 months prior to publication.

**Length.** Unless otherwise agreed to by our Editor-in-Chief, articles shall be at least 1,200 words in length.

**Author Information.** Please include (1) a complete article title, (2) the author(s) full name(s), academic degree(s), affiliation(s), financial connection to any products mentioned, and (3) full address for correspondence, including complete mailing address, fax number, telephone number, and e-mail address.

**Artwork.** A minimum of two figures (and related legends) should be supplied with each article. Digital files can be sent in JPG, TIF, or EPS format, and should be approximately 300 dpi at 4 inches wide. If sending via e-mail, JPEG images are preferred. Original slides and photos are also acceptable. Please be sure to indicate numbering and orientation of images.

**References.** References should be numbered in the order in which they appear in the text and listed at the end of the manuscript. Unpublished data (such as papers submitted but not yet accepted for publication and personal communications) should be cited parenthetically within the text.

Direct queries to Matt Pesotski, Editor-in-Chief, at [mpesotski@bmtoday.com](mailto:mpesotski@bmtoday.com) or (484) 581-1823. Address correspondence to Endovascular Today, c/o Bryn Mawr Communications II LLC, 1008 Upper Gulph Road, Suite 200, Wayne, PA 19087.

## VESSEL UPDATE: RADIAL ARTERY

radial artery may be considered as a vascular conduit for coronary artery bypass grafting, if the patient has no other decent conduit of vein, or if other arteries have been used. It may remove a surgical option for that patient.

**Endovascular Today:** *What questions do you ask before scheduling the patient?*

**Dr. Walker:** I ask if they have ever had any problem with their hand, such as hand or arm claudication. We always check by manually occluding the radial artery to confirm that the patient still has good ulnar blood flow. We will sometimes obtain a duplex ultrasound study to assess the radial artery size and blood flow to the hand. I would also want to determine if the patient is on anticoagulant therapy or if he or she has had bleeding issues elsewhere. Patients who have had multiple bleeding issues with femoral punctures are cases in which I would recommend radial access.

**Endovascular Today:** *Do you think acceptance of radial access will increase in the US?*

**Dr. Walker:** I do. I think it is an ideal access, especially in diagnostic studies. Because of issues with size, it is sometimes problematic in interventions. An increase in use is also contingent on the continued downsizing of equipment size. It also depends on how good vascular access closure becomes. If we had a perfect means of always closing femoral access sites, I think femoral access would be the preferred choice of access. However, we are far from having perfect vascular access management.

**Endovascular Today:** *Which factors would lead to increased acceptance? Which might impede it?*

**Dr. Walker:** If we could always close femoral access sites without complications, certainly the acceptance of or increased use of radial access would be impeded. Of course, one of the risks of femoral access is bleeding and the need to reverse anticoagulation. If these risks did not exist, as catheterization labs are currently set up, most cases are more easily performed from the femoral access than from radial access in terms of monitor or camera positioning, as well as other issues. However, there are certain advantages associated with using radial access, especially when there are very downward-swooping vessels or when no pulses can be felt. ■

Craig M. Walker, MD, is Medical Director and Founder, Cardiovascular Institute of the South in Houma, Louisiana. Dr. Walker may be reached at (800) 445-9676; [craig.walker@cardio.com](mailto:craig.walker@cardio.com).