Transradial Peripheral Arterial Procedures

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KEYWORDS

• Transradial catheterization • Radial approach for peripheral artery disease • Transradial endovascular interventions • Carotid artery intervention • Subclavian artery intervention • Renal artery intervention • Iliac artery intervention • Superficial femoral artery intervention

KEY POINTS

- Advantages of the transradial approach include less bleeding and other access-related complications, early ambulation and discharge, cost savings, and patient preference.
- Major limitations of the radial approach for peripheral interventions is lack of dedicated equipment with adequate working shaft length and smaller outer diameter.
- Multiple case series and technical reports exist showing the feasibility of the radial approach for treatment of different endovascular lesions from subclavian, carotid, abdominal arteries and lower extremity vessels.

Videos of transradial peripheral arterial procedures accompany this article at http://www.interventional.theclinics.com/

INTRODUCTION

In 2014, the debate over the safety and efficacy of transradial (TR) approach for cardiac catheterization is over. Reduced bleeding and other access-related complications, early ambulation and discharge, cost savings, and patient preference because of improved postprocedure comfort with faster recovery are some of the important reasons for the increased adoption of TR approach worldwide.[1–3] Because of the safety associated with radial access, the European Society of Cardiology consensus statement has recommended that radial access should be the default approach for cardiac catheterization.[3] A recent update using a retrospective cohort study from the CATH-PCI data registry showed an increase in TR interventions in the United States from 1.2% in the first quarter of 2007 to 16.1% in the third quarter of 2012, and may well be more than 20% at this time.[4]

In the presence of peripheral vascular disease (PVD), diagnostic and interventional cardiac catheterization procedures are associated with higher incidences of access-related complications.[5–7] A substudy of the CARP trial looked at 1298 patients with PVD undergoing diagnostic cardiac catheterization and showed a greater frequency of complications, including 22 major and 27 minor access-related complications.[8] In a retrospective review of 297 patients with aortofemoral PVD, upper extremity approaches for angiography were associated with lower complications compared with a femoral approach.[9]

The prevalence of peripheral artery disease in the United States is expected to grow from 8 to 12 million.[10,11] Percutaneous endovascular

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treatment of PVD is the fastest growing procedure.[11] The recognition of higher access-related bleeding complications in the presence of PVD and the demonstrated reduction in these complications by the TR approach have led to fresh interest in TR endovascular treatment of PVD. Multiple case series and technical reports exist showing the feasibility of the radial approach for treatment of different endovascular lesions from subclavian, carotid, abdominal arteries and lower extremity vessels.

FROM RADIAL ARTERY TO THE ENDOVASCULAR TARGET: TIPS AND TRICKS FOR SAFE AND EFFICIENT ACCESS TO THE PERIPHERAL CIRCULATION

Using the Knowledge of Radial Artery Size and Sheath Size

- The outer diameter (OD) of a sheath is almost 2 French (Fr) larger than the OD of the guide catheter of the same Fr size. For example, a 6-Fr glide sheath (Terumo Corporation, Somerset, NJ) has an OD of 2.61 mm and the OD of a 6-Fr guide catheter is 2.0 mm.
- Females, patients with small body mass index, and those with a smaller wrist size are likely to have smaller radial artery (RA). Whenever a patient's RA seems to be small based on clinical characteristics and palpation of the RA, rather than inserting the entire length of the introducer sheath and stretching the RA, the operator can insert 1 cm of the sheath into the RA (Fig. 1). This maneuver provides an atraumatic entry of the guide in to RA; because the catheter has a smaller OD, it is less likely to expand the artery and cause irritation, spasm, or dissection of the RA. We often use 7-Fr guide catheters with this technique when the need to use a larger balloon-expandable stents arises (see Fig. 1).
- A similar understanding of the length and OD of long sheaths is equally important for TR endovascular intervention. The currently available long sheaths that were originally designed for femoral access (60, 90, 110 cm), have nearly 1 Fr larger OD than a short sheath of same Fr size and are more likely to cause spasm. A 6-Fr, 90-cm Destination sheath (Terumo Corporation, Somerset, NJ) has OD of 2.83 mm. The Destination sheath does not have hydrophilic coating on the entire length of the catheter.

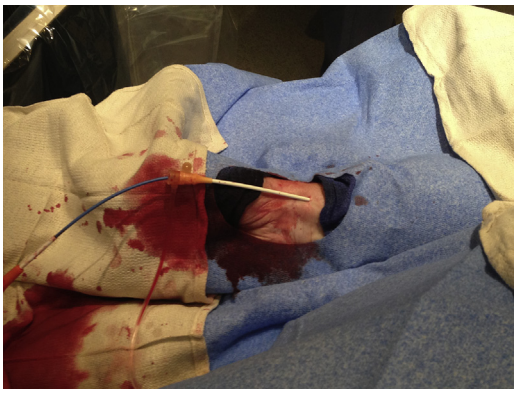

Fig. 1. Only 1 cm of a 7-Fr sheath is inserted in the radial artery to allow use of a 7-Fr guide catheter in a small size radial artery. (*From* Sanghvi K. Ten critical lessons for performing transradial catheterization. Endovascular Today 2014.)

Using the Knowledge of Distance From the Radial Artery and Equipment Length

- A major limitation of the RA approach for peripheral intervention is the lack of equipment with adequate shaft length to reach distal vascular lesions. Anthropometric measurement in Fig. 2 gives an approximate idea of the distance from the RA to different vascular beds.
- Using the right RA access for infradiaphragm vessels reduces operator radiation exposure, but left RA access increases the usable length of the catheter systems by about 10 cm.
- Positioning the patient supine in a reverse position (feet at the head end of the table) allows the operator to work from left RA easily, reach farther distal target in the lower extremity and reduces x-ray exposure (Fig. 3).
- When inadequate working shaft length is anticipated, the RA can be accessed 2 to 3 inches higher than normal; at this level, the RA is deeper but still separated from major nerves in the forearm. This high entry requires extra attention to hemostasis.
- The distances in Fig. 2 can vary depending on the extent of the tortuosity in the subclavian or brachiocephalic vessels, tortuosity and dilation of the aorta, and the height of the patient. By using a stiff wire inside the guide catheter when tortuosity is encountered, the tortuosity can be straightened, allowing the catheter