Use of the Ulnar Artery as an Alternative Access Site for Cerebral Angiography

SUMMARY: Although the common femoral artery is the easiest and most widely accepted access site for cerebral angiography, atherosclerotic, aortoiliac, or femoral artery disease can preclude this approach. We describe our experience using the ulnar artery access site in a patient with bilateral aortoiliac occlusive disease. This article may be useful to neuroradiologists who encounter difficulty with other arterial access sites. A description of the technique and a review of the pertinent literature are provided.

Discussion

At our institution, we frequently use radial artery access for cerebral angiography and neurointerventional procedures. Use of the radial artery access site has been widely documented in the cardiac and neuroradiology literature to be a safe alternative to the common femoral and brachial artery routes. A 4-vessel cerebral angiogram is easily performed through the radial artery, and neurointerventional procedures can be performed in the right vertebral and carotid arteries by using sheaths up to 6F. As demonstrated in our Technical Note, the ulnar artery provides an alternative approach to the radial, brachial, and axillary arteries when traditional transfemoral access is not possible.

In a prospective randomized trial comparing the radial and ulnar artery access routes for coronary procedures, Aptecar et al. demonstrated that the ulnar artery is an equally safe and feasible access site for performing angiography and interven-
tion in the coronary system. In the PCVI-CUBA study,7 93.1% of ulnar artery access attempts were successful. There was a 5.7% asymptomatic artery occlusion rate as demonstrated by follow-up forearm sonography. Of 216 transulnar cases, only 2 access-site complications (0.9%) were encountered, and neither required surgery or transfusion. One was a case of a large forearm hematoma (>10 cm) following ulnar artery access that resolved without consequence. The second ulnar artery access complication involved an asymptomatic small arteriovenous fistula discovered by routine Doppler evaluation that resolved after manual ulnar artery compression.

The ulnar artery may provide advantages over the radial artery as an access site for angiography. At some institutions, the radial artery is often used as a conduit for coronary artery bypass procedures. If use of the right radial artery is anticipated for coronary bypass, catheterization of this vessel is not recommended.10 As experienced in our case, severe radial artery spasm can rarely prevent successful sheath placement before angiography. In both of these circumstances, the ulnar artery provides a viable alternative to radial artery access, and sheaths up to 6F can be placed in the ulnar artery in cases in which intervention is anticipated.

Compared with access to the radial artery, access to the ulnar artery can be difficult for the inexperienced operator. The ulnar artery is generally less pulsatile than the radial artery because of its deeper location. In the current case, the ulnar artery was easily palpated and was at least as bounding as the radial artery. Extending the wrist before puncture may facilitate arterial puncture. To palpate the ulnar artery, one must apply light manual pressure to the ulnar artery proximal and distal to the entry site; however, care must be taken not to occlude the vessel proximal to the puncture site because this can make access difficult. Access to the ulnar artery is generally performed by puncturing the artery 1–3 cm proximal to the pisiform bone. There is a theoretic potential for injury to the ulnar nerve, which runs just medial to the ulnar artery, and patients may experience a “lightening-flash” sensation in the hand if the ulnar nerve is contacted with the micropuncture needle.7

As with radial artery access, angiography by using ulnar artery access can be performed on anticoagulated patients and in patients who receive periprocedural antiplatelet and thrombolytic agents. Manual pressure is easily applied to the puncture site, and passive compression devices can be applied to the wrist to provide hemostasis. Similar to the radial artery, the ulnar artery is not an end artery in most patients. If adequate collateral supply is documented with a reverse Allen test, inadvertent injury or occlusion of the ulnar artery is typically not a problem because the radial artery should provide sufficient perfusion to the hand. As with the radial artery route, ulnar artery access has a significant advantage over brachial artery access because the brachial artery is effectively an end artery, and occlusion can result in significant perfusion deficits in the distal arm. If radial artery access is initially unsuccessful, ipsilateral ulnar artery access is not recommended on the same day because of potential spasm incited in the radial artery that could result in hand ischemia if the ulnar artery becomes occluded or goes into spasm.8 Furthermore, ipsilateral ulnar artery access is relatively contraindicated in patients who have undergone radial artery harvest for coronary artery bypass grafting.

This article combined with the experiences in the cardiac literature may prove useful to neuroradiologists faced with difficult arterial access cases. If readily palpable, the ulnar artery can be accessed safely for cerebral angiography and is a promising alternative to the radial and brachial arteries for interventional neuroradiology procedures.

References