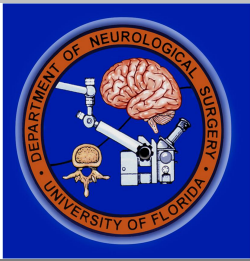




Direct Radial Artery Access with the 070 Neuron Guide Catheter for Aneurysm Coiling: A Novel Application of the Neuron Catheter for Cerebral Interventions

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Introduction

Most neuroendovascular interventions rely on a transfemoral approach to the intracranial circulation, however this is sometimes not possible due to complex aortic arch anatomy or femoral arterial disease. Transradial arteriography and intervention is well established in interventional cardiology and there have been some reports of successful neurointervention using this technique. The incidence of radial artery occlusion or other access site complication after transradial access is directly related to the outer diameter of the sheath used to access the artery.

Methods

We describe a technique to directly access the radial artery with a 070 Neuron catheter, without the need for a large 6-F sheath, for cerebrovascular interventions.

Description of the Technique

Radial arterial access is obtained with a 21 gauge micropuncture needle (Cook, Bloomington, Indiana), the 0.018” microwire is then threaded into the artery and then the needle is exchanged for the enclosed 4-F dilator. The microwire and inner cannula are removed, leaving the 4-F dilator in place. We then infuse a “radial artery cocktail” (Table 1) through the dilator over 3 minutes. This critical step allows for treatment of radial artery vasospasm and allows for maximal arterial dilation to accommodate a large guide catheter.

Table 1

Table 1 -- Radial Artery Cocktail		
Total volume 3.25ml, infused through the 4-F dilator prior to Neuron catheter placement.		
Medication	Concentration	Volume
Heparin	5000 IU/ml	1 ml
Verapamil	2.5 mg/ml	1 ml
Nitroglycerin	400 ug/ml	0.25 ml
Lidocaine	2%	1 ml

We then place a 0.035” guidewire into the dilator and exchange for a short 5-F Avanti+ sheath (Cordis, Bridgewater, New Jersey). We perform a baseline radial arteriogram via the 5-F sheath. We prepare a 6-F 070 Neuron guide catheter on the back table and insert a 5-F 125cm VTK catheter (Cook, Bloomington, Indiana) coaxially within the neuron. This is set up such that the VTK acts as a dilator as the Neuron catheter passed through the subcutaneous tissue and enters the radial artery. Next, we advance an exchange length 0.038”

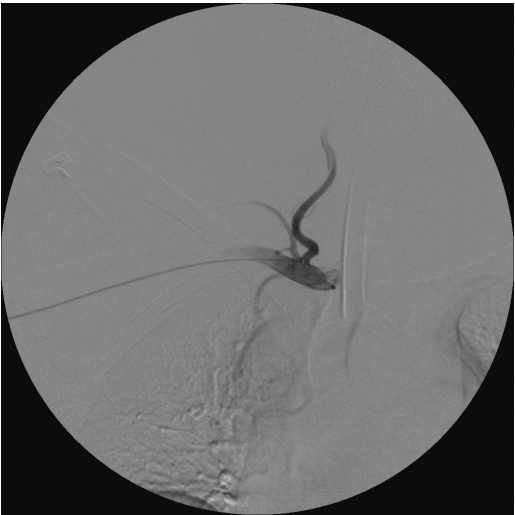
glidewire into the sheath, up the radial, brachial, and into the subclavian artery. We remove the 5 French Sheath over the wire and then advance the 070 Neuron – VTK construct into the radial artery over the 0.038” glidewire. Once the tip of the Neuron catheter had advanced to the level of the brachial artery, the VTK is pinned, and the 070 Neuron is advanced alone over the glidewire to the level of the subclavian artery. At this point, the VTK and 0.038” glidewire are removed and the 070 Neuron back-bled, flushed, and hooked to a continuous heparinized flush solution. From this location, a subclavian arteriogram is performed through the Neuron catheter. An 0.035” glidewire is then used to select the vertebral artery, and the neuron is advanced into the vertebral artery over the glidewire. Alternatively, if there is excessive angulation at the origin of the vertebral artery preventing direct selection with an 0.035” glidewire, a microcatheter may be used to select the vertebral artery from a Neuron positioned in the subclavian. Once the microcatheter is advanced to the distal vertebral artery, the Neuron can be advanced over the microcatheter. Intracranial interventions can then be performed from this vertebral artery access.

Figure 1



Complex arch anatomy prevents right vertebral catheterization in a patient with a ruptured right PICA aneurysm.

Figure 2



View of right vertebral origin via right radial approach.

Figure 3

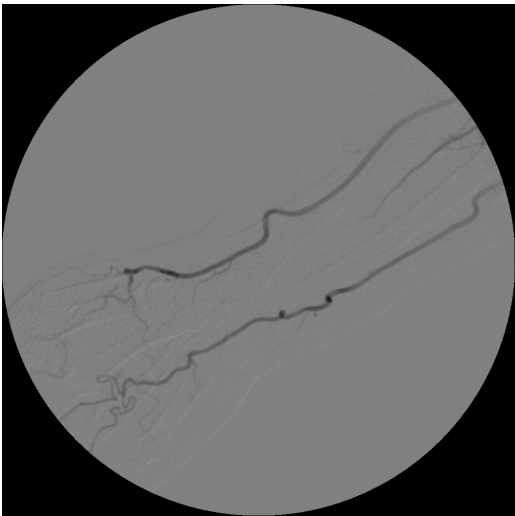


View of ruptured right PICA aneurysm after successful catheterization of the right vertebral artery via the direct access approach in the right radial artery.

Results

Two successful cases are described in which this technique was used. Case one describes the successful Y-stent placement for coiling of a basilar tip aneurysm, and case two describes coiling of a ruptured PICA aneurysm.

Figure 4



Right brachial arteriogram at 3 month follow-up, demonstrating normal radial and ulnar arteries.

Conclusions

Direct access of the radial artery with the 070 Neuron is feasible and provided a stable guide platform for two complex posterior circulation neuroendovascular interventions. Since radial access has demonstrated a high degree of safety and low rates of access site complication, there may be an increasing role for radial artery access for neuroendovascular interventions as neurointerventionalists become more comfortable with the approach. Utilizing a sheathless access technique, the radial arteriotomy size can be minimized, thereby potentially reducing the risk of access site complication, while maintaining 6-F guide access for complex cerebral interventions.