



PHYSICIANS

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ACCESS SITES

- Femoral artery 95% of the time.
- Brachial artery 1% of the time if the infrarenal aorta is occluded; it is very difficult to get the wires and sheaths to track into the carotid via the brachial artery (most practical when approaching a left carotid lesion from the right arm via a bovine arch).
- Ipsilateral common carotid if you are unable to access from the femoral or brachial artery; if during carotid endarterectomy, the lesion is too high (can avoid mandibular subluxation).

DIAGNOSTIC DEVICES USED

SHEATH SIZES

6 F or 7 F.

FLUSH DIAGNOSTIC CATHETERS

- 5-F, long pigtail catheter for arch angiograms.
- 5-F selective catheter for selected carotid angiograms.
- Note: all air must be removed to prevent air emboli.

SELECTIVE DIAGNOSTIC CATHETERS

- JR4: default catheter.
- H1: tip is longer and slightly more flexible; does not select as well as the JR4 but sometimes tracks over the wire more easily.
- Vitek or SIM1: reverse angled catheters; necessary for selecting orifices that originate at a reverse angle but they do not track well.

DIAGNOSTIC GUIDEWIRES

- .035-inch Bentson wire.
- Angled hydrophilic wire: if the wire needs to be steered, stiff-angled hydrophilic wire may be helpful for tracking the catheter.

DIAGNOSTIC NOTES

- Ensure that there is no air or debris in the injection tubing, catheter, syringe, etc.
- Patients should be placed on heparin before any manipulations in the arch.
- Thoracic aortograms are helpful for defining the arch (not necessary with a preoperative arch study

[CTA/MRA]); however, there is a risk of stroke with each angiogram obtained.

- LAO of 30 to 40 degrees is helpful for splaying out the arch when selecting the artery.
- Be wary of a bovine arch or common origin when selecting the left common carotid artery.
- Image intensifier position may need to be changed (oblique vs AP) to splay out the bifurcation and define the lesion.
- Intracranial views need to be in AP and lateral to fully define anatomy.

INTERVENTIONAL DEVICES USED

SHEATHS

A 6-F or 7-F, long sheath is used. It is optimal to have an 80-cm (becomes 90 cm with the Tuohy-Borst adaptor) length so that a 100-cm catheter can form outside the sheath in case arterial selection needs to be performed through the long sheath.

WIRES

- Stiff wire: allows introduction of the sheath into the carotid artery.
- Device wire: .014-inch wire that has the distal embolic protection (DEP) device on the end; the interventions are performed over this wire.
- Hydrophilic wire: used as a “buddy” wire for significant tortuosity may be helpful for introducing the DEP.

PTA BALLOONS

- Monorail/rapid exchange ideal.
- 4 mm to 8 mm in diameter, with various lengths (2-4 cm).
- Do not balloon outside the stent (dissection or spasm may result).

STENT

- Usually, we use the stent associated with the DEP; however, sometimes, we may need to use a different one for trackability, visualization, etc.
- Stent should be self-expanding.
- Tapered stents are ideal because the stent will usually traverse from the ICA to the CCA.

OTHER DEVICES

- DEPs are associated with the interventional wire.
- DEPs must be prepared properly to remove any air.
- DEPs are usually deployed in the carotid siphon.
- DEPs may need to be sized for the ICA depending on the manufacturer.
- DEPs should be used in all carotid PTA/stenting procedures.

INTERVENTIONAL NOTES

- Never lose wire.
- The DEP, when open, cannot be pulled through the stent or it will get stuck; thus during manipulations, it is important to note the location of the DEP.
- Predilation is usually not necessary unless the stent

will not cross the lesion.

- Postdilation is usually necessary.
- Atropine should be made up and ready to inject if bradycardia or asystole occurs; some patients may be good candidates for prophylactic atropine (.5 mg).
- Minimize manipulations around the lesion before the DEP is deployed.
- A good roadmap is necessary for manipulations.
- With each maneuver (DEP deployment, PTA, stenting) a new roadmap should be generated, as the anatomy can become distorted or the patient can move.
- Severe calcification or tortuosity may be a contraindication to CAS.
- Completion angiography should be performed before capturing the DEP; this keeps the wire in place in case another manipulation (ie, repeat PTA or additional stenting) is necessary.
- Completion angiogram with an abrupt cutoff at the DEP usually suggests an occluded DEP (debris, thrombus); immediate aspiration followed by capture of the DEP should be performed with repeat angiography.
- Spasm can be treated with intrarterial nitroglycerine.
- Salvage procedures can be performed with microcatheters, abciximab, and thrombolytics.

IMAGING NOTES

- CAS can be performed on a mobile or fixed unit.
- DSA/roadmapping is critical.
- Full range of motion for the image intensifier is important (rotational obliquities).

CONTRAST AGENTS

- Omnipaque.
- Visipaque.
- Gadolinium.
- In patients with significant renal dysfunction, a mixture of Visipaque and gadolinium will reduce contrast doses without compromising visibility.

TESTS/MONITORING

- ACT is not necessary.
- Invasive monitoring (A-line) is not necessary.
- Telemetry and blood pressure cuff are critical especially at time of angioplasty.

CAROTID ARTERY STENTING

PHARMACEUTICALS

- Atropine.
- Heparin.
- Patients are pretreated with ASA/clopidogrel for at least 1 week and maintained on this regimen for 1 month postprocedure; extended-release dipyridamole can be used if clopidogrel is not tolerated.
- Patients with renal dysfunction can be pretreated with acetylcysteine solution and HCO₃ solution.

ANESTHESIA

Local with sedation is ideal (to have the patient move his/her head) also good for testing neurologic function. ■