

# Managing Dissections During TCAR

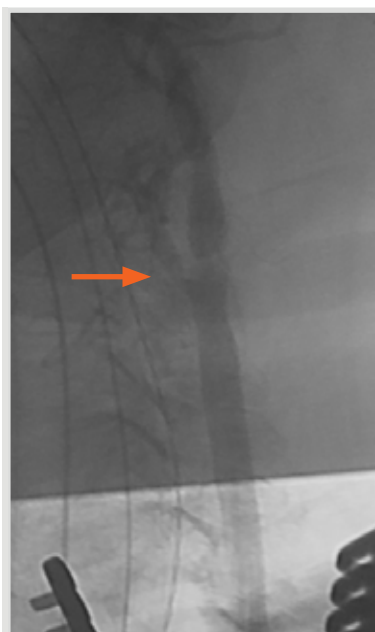
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TransCarotid Artery Revascularization (TCAR) is a novel and innovative approach to the treatment of extra-cranial carotid artery occlusive disease. This procedure minimizes many of the risks inherent in trans-femoral carotid artery stenting (TF-CAS) such as navigating the aortic arch, or crossing a complex carotid bifurcation lesion with a distal embolic protection device while the brain is unprotected. Recent data from the SVS/VQI TCAR Surveillance Project demonstrated patients undergoing TCAR had significantly higher medical comorbidities, but half the risk of in-hospital TIA/Stroke/Death compared to patients undergoing TF-CAS.<sup>1</sup>

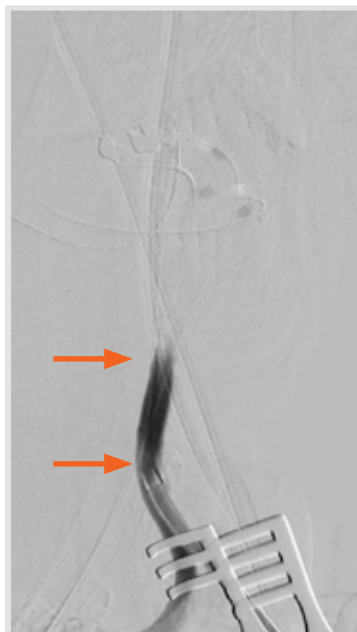
An infrequent but potentially concerning complication of TCAR can be the occurrence of common carotid artery (CCA) dissection. The risk of CCA dissection is increased in patients with pre-existing CCA disease and deeply situated CCAs. The occurrence of a CCA dissection during TCAR can be anxiety-provoking for the surgeon but there are a series of steps that can be taken that will, in the majority of cases, allow the TCAR procedure to be completed safely. These steps are reviewed below.

The arteriogram is that of an elderly woman with a symptomatic left internal carotid artery (ICA) stenosis. Following placement of the micropuncture sheath, the arteriogram (Figure 1) shows a severe ICA stenosis.

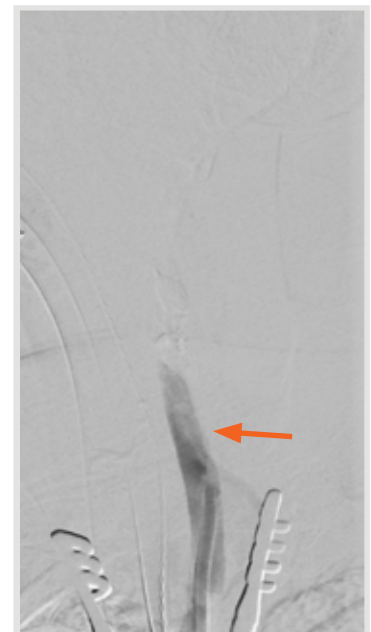
Following placement of the ENROUTE<sup>®</sup> Arterial Sheath, a repeat arteriogram (Figure 2) shows occlusion of the distal CCA without flow into the ICA. There were no electroencephalogram (EEG) changes. At this point in time it was assumed this was due to a CCA dissection.



*Figure 1. Arteriogram of elderly patient*



*Figure 2. Occlusion of the distal CCA*



*Figure 3. View of CCA dissection*

2 VIEWS: A second view 90 degrees orthogonal to the initial view (Figure 3) more clearly shows the dissection (arrow).

At this stage, two important steps to help cross the dissection are:

1. Withdraw the sheath approximately 1 cm
2. Begin retrograde flow

Pulling back the sheath should allow the sheath tip to withdraw out of the dissection plane, while initiating retrograde flow should induce the intimal flap that was propagated forward to lay flat within the vessel wall. Together these steps will allow for better visualization of the CCA and carotid bifurcation. Figure 4 below shows that following these steps, the carotid bifurcation can now be visualized and the dissection (arrow) can also be better appreciated. An alternative

strategy would be to remove the sheath, close the puncture sight and re-puncture more proximally in the CCA.

The dissection and lesion can then be crossed with the wire and the bifurcation stent placed in the usual fashion (Figure 5).

Lastly it is important to tack down the dissection flap which usually requires a second stent more proximally in the CCA. To do this, the stent is positioned such that the proximal-most 5 mm are in the sheath. The sheath is then withdrawn 5 mm (1.5 cm total) to expose the stent and the stent is deployed (Figure 6). The 2.5 cm sheath length allows for this withdrawal to happen safely. The lower portion of the stent can be seen just at the tip of the sheath (arrow). The puncture site is then closed in the usual manner.



Figure 4. Visualization of carotid bifurcation following sheath withdrawal and retrograde flow



Figure 5. Bifurcation stent placement



Figure 6. Visualization of lower portion of stent at the tip of sheath

## References

1. TransCarotid Artery Revascularization (TCAR) vs. Transfemoral Carotid Artery Stenting (TF-CAS) in the SVS Vascular Quality Initiative – J Vasc Surg Vol69, Issue 1, Pages 92–103.e2



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