



Rescue Collateral Flow in Color Duplex Sonography

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Oclusion of the common carotid artery (CCA) is generally associated with the absence of blood flow beyond the occluded CCA.¹ However, collateral circulation may preserve the patency of the vessel distal to the occluded CCA, and the occipital artery may provide a rescue connection between the carotid and vertebral arteries when either one is occluded.² The accuracy of color duplex sonography in identifying the CCA occlusion (CCAO) is 97% with a sensitivity of 91% and a specificity of 99%.³ It is also very useful in defining the patent distal vessels above an occluded CCA. In this study, we report a case of a CCAO that showed a patent internal carotid artery (ICA) and external carotid artery (ECA). We describe the color duplex sonographic appearance of the collateral circulation.

Abbreviations

CCA, common carotid artery; CCAO, common carotid artery occlusion; ECA, external carotid artery; ICA, internal carotid artery

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Case Report

A 78-year-old woman visited a hospital because of decreased visual acuity in her left eye for 1 day. The ophthalmologic examination and fluorescein angiography of her left eye established the diagnosis of central retinal artery occlusion. Color duplex sonography, performed for carotid artery evaluation, revealed a hyperechoic heterogeneous plaque (3.8 mm) at the left ICA origin, which might have been responsible for her central retinal artery occlusion via thromboembolism. Atherosclerotic stenosis of the left ICA was further confirmed by cerebral angiography. In addition to the symptomatic left carotid atherosclerotic lesion, total occlusion of the right CCA was found during color duplex sonography. However, collateral flow was observed beyond the occluded right CCA, and the flow was reestablished at the carotid bulb. A retrograde collateral filling of a branch vessel supplied the ICA and ECA distal to the occluded CCA. The flow in the ICA and ECA was directed cephalad (Figure 1 and Video 1), and the vertebral arteries had normally directed flow.

■ Video online at www.jultrasoundmed.org.

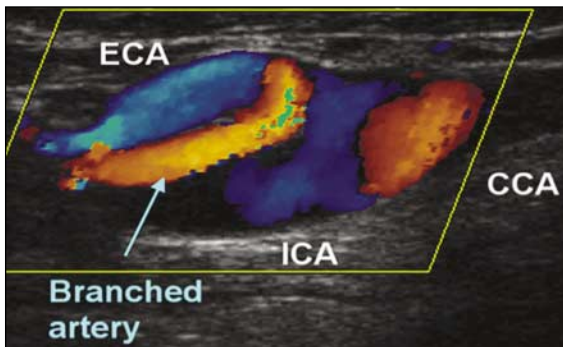


Figure 1. Color duplex sonography showed a CCA occlusion. However, a retrograde collateral branched artery flow supplied the ECA and ICA.

Cerebral angiography of the right innominate artery showed right CCA occlusion (Figure 2). The branch vessel that supplied the ICA and ECA was found to be the hypertrophied occipital artery, which originated from the cervical portion of the right vertebral artery (Figure 3).

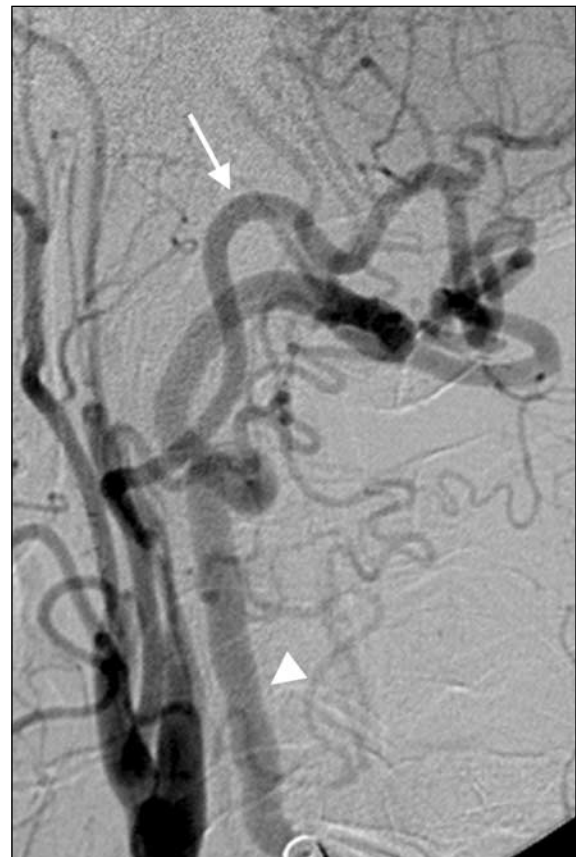
Figure 2. Cerebral angiography of the right innominate artery showed the right CCA occlusion (arrow) and the prominent right vertebral artery (arrowhead).



Discussion

The prevalence of CCAO in patients with cerebral angiography for the evaluation of focal neurologic symptoms ranges from 1% to 5%.^{4,5} The occipital vertebral anastomosis constitutes an important arterial anastomotic network, interconnecting the vertebral and external carotid systems through the occipital artery.⁶ The presence of such an alternative circulatory pathway might indicate that our case could have a benign neurologic course. As shown in this case, color duplex sonography appears to be an effective and a sensitive method for evaluating the patency of the arteries and the patterns of collateral flows beyond the occluded CCA.

Figure 3. Cerebral angiography revealed that the hypertrophied occipital artery (arrow) delivered collateral flow distal to the occluded CCA from the cervical portion of the right vertebral artery (arrowhead).



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