

## CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

### Vascular Diseases Quiz – Case 11

An 84 year-old male was presented to our Department with recurrent episodes of drop attacks, diplopia and dizziness. Physical examination and laboratory investigation were unremarkable. His past medical history was notable for smoking, diabetes mellitus, hypercholesterolemia and hypertension. The patient was subjected to 4-vessel arteriogram for imaging of both carotid, subclavian and vertebral arteries (fig. 1A). The angiogram demonstrated total occlusion of the left internal carotid artery and a severe stenosis at the origin of the left vertebral artery. The latter was treated successfully with balloon angioplasty and stenting that resulted in relief of patient's symptoms (fig. 1B).

#### Comment

Atherosclerosis is the most common cause of vertebrobasilar ischemia (VBI). Plaque formation results in stenosing lesions that may affect the vertebral artery at any level but are most common at its origin from the subclavian. Plaques at the vertebral artery show the same degenerative features as plaques that appear elsewhere, such as ulceration, intraplaque hemorrhage, and surface thrombus. The growth of a plaque may ultimately result in thrombosis of the vertebral artery. Interestingly, the vertebral artery can also be compressed by bone, mostly by osteophytes, throughout its cervical trajectory. Dissections and arteriovenous aneurysms, often related to trauma can also cause VBI.

The spectrum of symptoms of VBI patients includes dizziness, diplopia, vertigo, tinnitus, perioral numbness, drop attacks, and alternating paresthesias. Two patterns of clinical presentation of VBI are recognized, depending on whether the patient has hemodynamic or embolic ischemia. Hemodynamic symptoms tend to be brief in duration and stereotyped. They appear frequently and can generally be triggered by changes in the position of the patient's body or neck and can be relieved by lying down. Thromboembolic



**Figure 1.** A: Preoperative angiogram demonstrating total left internal carotid artery occlusion and homolateral vertebral artery stenosis (arrow). B: Successful treatment of the vertebral artery stenosis with angioplasty and stenting.

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2009, 26(2):280

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symptoms tend to last longer and they are independent of body and neck position and are generally accompanied by findings of small infarctions in magnetic resonance imaging (MRI) of the brain stem.

Prognosis associated with the two types of ischemia is also different: strokes are uncommon in hemodynamic VBI patients, who experience complications derived from loss of balance (mainly falls), automobile accidents, and other mishaps. Thromboembolic disease of the vertebrobasilar (VB) system has a grim prognosis, carries a high risk of permanent neurologic deficits and may be life threatening.

Physical examination should begin with the recording of blood pressure and pulses in both upper extremities. An absent or markedly decreased radial pulse should raise the suspicion of a subclavian stenosis with a subclavian-vertebral steal. This condition should be ruled out as a likely mechanism whenever the pressure difference between both brachial arteries is greater than 20 mmHg. If the symptoms are caused by rotation, flexion or extension of the neck, they should be reproduced with the patient sitting up. The patient's head should be moved slowly to the trigger position with the physician being ready to assist the patient if loss of consciousness or imbalance occurs.

With regard to imaging studies, duplex ultrasonography has limited use for evaluation of VBI. MRI scans of the brain may show small infarctions in the brain stem or cerebellum. The gold standard imaging study to show the arterial lesion that may be the cause of the problem however is the 4-vessel arteriogram with selective injections into both carotids and subclavian arteries so as to outline the anterior and posterior circulation.

Treatment of affected patients may initially consist of readjustment or change in blood pressure medication, the use of elastic stockings and advice on how to avoid sudden changes in position. If symptoms persist however, and the arteriogram shows a critical lesion of the vertebral artery, consideration should be given to correction of the anatomic blockage. Percutaneous transluminal angioplasty and stenting represents a minimal invasive attractive procedure with very good results when applied in large volume centers. Alternatively, a surgical vertebral to carotid transposition or subclavian-vertebral artery bypasses can be applied, however with higher operative risk.

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**Diagnosis:** Unilateral internal carotid artery total occlusion and vertebral artery stenosis