Bilateral cortical blindness associated with carotid stenosis in a patient with a persistent trigeminal artery

Case report

DAVID J. HEENEY, M.D., AND ANDREW H. KOO, M.D.
Department of Radiology, Santa Clara Valley Medical Center, San Jose, California

A patient with findings of bilateral cortical blindness and a unilateral carotid bruit is reported. A persistent trigeminal artery allowed emboli from a unilateral ulcerated internal carotid plaque to affect the visual cortex bilaterally. The angiographic findings and a brief discussion of this anomalous artery are presented.

KEY WORDS: persistent trigeminal artery, cortical blindness, carotid artery stenosis

Unilateral cortical blindness can be a presenting symptom of transient ischemic attacks of the carotid circulation, whereas bilateral involvement is typically attributed to the vertebrobasilar system.

We have recently studied a patient presenting with bilateral cortical blindness caused by an ulcerated plaque of the internal carotid artery. This symptom complex was possible only because of the existence of a carotidobasilar anastomosis in the form of a persistent trigeminal artery.

Case Report

This 65-year-old Chinese woman presented with a 1-month history of temporary attacks of complete blindness with associated dizziness. This had occurred on three occasions; one episode lasted for 1 hour, one for 5 minutes, and one for 10 minutes. The only other symptoms were decreased hearing and bilateral tinnitus. Her physical examination was remarkable only in the discovery of a left carotid bruit.

Cerebral arteriograms (Figs. 1 and 2) revealed a high-grade stenosis of the left internal carotid artery with a small ulcerative plaque in the stenotic segment. A left carotid endarterectomy was performed, and the patient has since been free of symptoms.

Discussion

The trigeminal artery is normally seen in the human only during the 3- to 14-mm embryonic stage. Its function is to supply blood to the primitive hindbrain. This region is supplied by the basilar and posterior communicating arteries in adult life, but these arteries do not develop until the 7- to 12-mm embryonic stage. The trigeminal artery normally involutes as the basilar system develops and is not normally patent after the 14-mm stage. The embryology of this artery was first thoroughly documented by Padget in 1968.

Rarely, the trigeminal artery will persist into adult life as an anastomosis between the carotid and basilar artery systems. This anomaly was first reported by Quain in 1844. Sutton demonstrated this lesion angiographically in 1950. In their extensive search of the literature, George, et al., described an incidence of 0.3% for this anomaly, and they found it in 0.6% of their own series of 3000 patients who underwent angiography.

In most reported cases of this entity, no symptoms or pathological changes could be found. This tendency is not a rule, however, and reports on associated clinical disease include descriptions of oculomotor paresis, tic douloureux, subarachnoid hemorrhage, retarded mental development, arterio-
D. J. Heeney and A. H. Koo

Fig. 1. Left common carotid angiogram. Left: Anteroposterior view showing a distinct ulcerative plaque at the origin of the left internal carotid artery, associated with high-grade stenosis. Right: Lateral view showing the ulcerative lesion at the origin of the internal carotid artery. The trigeminal trunk is well demonstrated arising from the cavernous portion of the internal carotid artery to supply the basilar system.

Fig. 2. Left common carotid angiogram, anteroposterior view, showing the trigeminal artery supplying the basilar system and the vascular distribution of both posterior cerebral arteries.

venous malformation,² and cavernous sinus syndrome.⁶

Although bilateral cortical blindness is usually a manifestation of vertebrobasilar disease, it can be caused by a pathological lesion of the carotid system, as in our patient. A persistent trigeminal artery should not be excluded as a cause of bilateral cortical blindness.

Acknowledgment

We would like to thank Dr. Donald Prolo for this interesting referral.

References

Bilateral cortical blindness with carotid stenosis


Address reprint requests to: David Heeney, M.D., Department of Radiology, Santa Clara Valley Medical Center, 751 South Bascom Avenue, San Jose, California 95128.