Occlusion of All Four Extracranial Vessels With Minimal Clinical Symptomatology. Case Report

BY JIRI J. VITEK, M.D., JAMES H. HALSEY, JR., M.D., AND HOLT A. MCDOWELL, M.D.

Abstract:
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A case of a 55-year-old man with occlusion of both vertebral, left common carotid and right internal carotid arteries is described. Also present was 95 per cent stenosis on the origin of the right external carotid artery with severe atherosclerotic disease on both subclavian and innominate arteries. Clinical symptoms consisted of blindness of the left eye; otherwise the patient was free of neurological signs. It is suggested that not only the presence of extracranial occlusive disease but also the status of the intracranial circulation, the time factor in which the extracranial vessels became occluded, and the adaptability of the individual to establish all possible means of collateral flow play their roles in correlation of extracranial atherosclerotic disease and clinical symptomatology.

Additional Key Words: extracranial cerebral vascular disease, transient ischemic attacks, extracranial collateral circulation, cerebral angiography.

In contemporary neurological practice, aggressive use of angiography in evaluation of patients with cerebral ischemic symptoms often reveals extensive occlusive disease, sometimes with unusual patterns of collateral flow. Many such patients have already suffered severe clinical disability. We wish to present a case which is unique in that very minimal clinical symptoms were present, despite occlusion of both carotid and vertebral arteries, due to extensive extracranial collateral and virtual absence of intracranial disease. Serial angiographical study permitted observation of the chronological evolution of the disorder.

Case Report

This 55-year-old Caucasian man was first admitted to the University Hospital in November, 1961; he was then 45 with a three-year history of increasingly severe claudication coincident with recurring episodes of vertigo and dysarthria. Neurological examination at that time was negative except for the presence of bruises over both subclavian, left carotid, right renal and both femoral arteries. His blood pressure was 200/100 in the left arm and 190/100 in the right arm. Angiographical study revealed stenosis of both subclavian arteries, occlusion of the left vertebral artery and 90% stenosis of the origin of the left internal carotid artery. A left carotid endarterectomy was performed after which he was free of neurological symptoms. Seven weeks later percutaneous left carotid arteriogram revealed satisfactory patency of the surgical region. Translumbar aortogram was then performed and showed 80% stenosis of the right common iliac artery. The renal arteries were free of disease.

In November 1964 he had four episodes of severe vertigo. Cerebral angiography (fig. 1), performed by bilateral axillary approach and direct puncture of the left common carotid artery, then revealed occlusion of the left vertebral artery, 60% stenosis at the origin of the left internal carotid artery, and significant stenosis at the origin of the right vertebral and left subclavian arteries. The bifurcation of the right common

From the Department of Radiology, the Division of Neurology, Department of Medicine, and the Department of Surgery, University of Alabama Medical Center, 1919 Seventh Avenue South, Birmingham, Alabama, 35233.

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carotid artery was free of arteriosclerotic disease. This procedure was complicated by loss of the radial artery pulsation on the right which was treated with stellate ganglion block.

In November, 1970, he suffered sudden onset of left eye blindness. There was no recovery from this. In June, 1971, he was readmitted to this Center following an episode of mild right hemiparesis and dysarthria. Left optic atrophy was present and there were bruits over the right carotid artery, both subclavian arteries, the abdominal aorta, and both renal arteries, and an

**FIGURE 1**

Bilateral axillary arteriography, November, 1964. Right common carotid artery (1), left common carotid artery (2), right vertebral artery (3), left subclavian artery (4), remnant of the left vertebral artery (5).

**FIGURE 2**

Arch study by right axillary approach, June, 1971. Right common carotid artery (1), right vertebral artery (3), left subclavian artery (4), basilar artery (6), right subclavian artery (7), innominate artery (8). Arrows point on the muscle branches of both subclavian arteries and on the cervical muscular collateral network, the only supply of the brain circulation.
almost undetectable pulse in both groins. The left common carotid artery pulse was absent. Arteriography was performed through right axillary artery. Aortography (fig. 2) was followed by selective injections into the left subclavian, right common carotid and right subclavian arteries (figs. 3-5). The study revealed occlusion of the left common carotid artery (fig. 1), both vertebral arteries (figs. 2-4), and right internal carotid artery (fig. 1). The origin of right external carotid artery was stenosed 95% (fig. 5), the proximal portion of the left subclavian artery showed severe arteriosclerotic irregularities and stenosis (fig. 1), and stenosis was seen in the innominate and right subclavian arteries. The entire brain was supplied through muscular branches of both subclavian arteries (figs. 2-6) which through muscular neck arterial collateral network filled the distal
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FIGURE 5
Right subclavian injection, later phase, lateral view. Right common carotid artery (1), both middle cerebral arteries (2), right vertebral artery (3), anterior cerebral arteries (4), both posterior cerebral arteries (5), basilar artery (6), right external carotid artery (7), partially supplied through the occipital artery. Anterior arrow points on the stenosis of the origin of the right external carotid artery. Posterior arrow points on the collaterals which supply the distal segment of the right vertebral artery.

Discussion
Weibel and Fields\textsuperscript{2} describe a complex case of extracranial atherosclerotic occlusive disease. Their patient was a 62-year-old man with a segment of the right vertebral artery. Through the posterior communicating arteries the contrast went from the basilar artery into both middle and anterior cerebral arteries (figs. 4-6). No communication between the right external carotid artery and intracranial circulation was present.

He was re-examined clinically in September, 1971. He was working four to six hours a day (bank executive). He was blind in his left eye; the slurring of the speech and right hemiparesis had disappeared. His primary limiting difficulty has been claudication in both lower extremities. Blood pressure is controlled at 140/90 bilaterally and the anticoagulant treatment with Coumadin continues.

Weibel and Fields\textsuperscript{2} describe a complex case of extracranial atherosclerotic occlusive disease. Their patient was a 62-year-old man with a
one-year history of lightheadedness which was
related to looking upward. Two months prior
to admission, he had suddenly developed
diplopia, following extension of his head and
neck, and was unconscious for a brief period.
Upon regaining consciousness, he had left
facial weakness, slurred speech and a tendency
to stagger to the left. He had right carotid and
bilateral subclavian bruits. He was studied by
means of direct percutaneous angiography. On
the right common carotid artery injection, the
internal carotid was seen to be occluded with
good filling of the external carotid. The siphon
of the internal carotid artery was filled by way
of the internal maxillary artery. The most
distal portion of the right vertebral was
opacified by way of an anastomosis from the
external carotid artery. Faint filling of the
basilar artery was achieved. The left common
carotid artery was also studied by direct
puncture. The internal carotid was found
occluded. However, there was good collateral
circulation through the orbit between the
branches of well-opacified external carotid and
ophthalmic arteries into the carotid siphon.
The distal portion of the left vertebral artery
was again supplied through collaterals via the
occipital artery. From this study the authors
concluded that there was occlusion of both
internal carotid arteries and assumed occlusion
of the proximal portion of both vertebral
arteries. The aorta and its principal branches
were not visualized angiographically, however.
We could add that collateral filling is not proof
of occlusion of the proximal portion of the
vessel. Usually collateral flow is well estab-
lished before the vessel is occluded.
Mishkin3 described two cases with occlu-
sion of both internal carotid and left vertebral
arteries. The first patient had already had a
completed stroke. In this case both external
carotid arteries were patent and participated in
the supply of intracranial circulation. The
second patient demonstrated only moderate
right hemiparesis. Again both external carotid
arteries were patent.
Meyer, Sheehan and Bauer4 reported a
case of a 50-year-old woman with bilateral
occlusion of the internal carotid arteries and
tortuous and irregular lumina of the cervical
portion of both vertebral arteries. Their patient
was aphasic, blind, stuporous, hemiparetic,
hemianopic and hemianalgesic.
Our case is exceptional in both angiog-
raphical findings and clinical history. A man
with occlusion of all four extracranial arteries
is free of cerebral symptoms with the exception
of left eye blindness. Such extensive extracra-
nial arteriosclerotic disease has never been
reported in a patient with such limited
symptomatology. In our judgment the absence
of clinical symptoms here is due to the absence
of intracranial disease, and the remarkable
extracranial collaterals. The correlation of
 cerebral symptoms and demonstrable extracra-
nial arterial disease is dependent not only on
the state of all the vessels through the
intracerebral and extracerebral course but also
on the time factor in which the extracerebral
vessels became occluded and on the adaptabili-
ty of the individual to establish all possible
means of collateral blood flow.

References
1. Bosniak MA: Cervical arterial pathways associ-
ated with brachiocephalic occlusive disease.
Amer J Roentgen 91: 1232-1244 (June) 1964
Oclusive Cerebrovascular Disease. W. B.
Saunders Company, Philadelphia, Pennsylvania,
1969
3. Mishkin MM: Extracranial ischemic lesions
which secondarily involve the brain. Radiol
Clin N Amer 5: 395-408 (Dec) 1967
study of cerebrovascular disease in man. Arch
Neural 2:27-45 (Jan) 1960
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