Excision of Arteriosclerotic Aneurysms of the Cervical Internal Carotid Artery

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About one-half of the aneurysms of the extracranial internal carotid artery are of arteriosclerotic origin. Traumatic, mycotic and erosive aneurysms make up the remainder.29 Significant problems caused by the arteriosclerotic lesions are mainly ischemic. They arise by 1) thrombosis and occlusion,2) distal embolization, and 3) diminished flow because of kinking of the tortuous distal vessel.9

Treatment has been only palliative until recent years. Mott’s introduction of ligation of the carotid artery in 1821 led to gradually increasing use of this procedure, later combined with ancillary measures. Only in the past decade has definitive therapy in the form of resection come into use.

Case Report

HIGH #30-450. I.F.S., a 75-year-old Caucasian woman, was admitted to Harbor General Hospital on May 3, 1963, because of a painful mass in the left anterior cervical region. The mass in the neck was noted first in 1948, and it grew slowly thereafter. In 1949 the neck was explored and a 7×5×5 cm. aneurysm of the internal carotid artery was disclosed. Because of technical considerations, no resection was performed at that time. Postoperatively, the patient did well except for initial transient difficulty with speech, mastication and deglutition. The mass remained unchanged and asymptomatic. Two weeks before her present admission the patient noted recurrent pain and an increase in the size of the mass. Also, in this period she had 3 episodes of light-headedness and transient syncope associated with physical exertion, which cleared quickly with rest.

Examination. Blood pressure was 170/80 mm. Hg. A 5×7 cm. pulsatile mass was present below the angle of the left mandible. This was not tender and fixed, with a loud systolic bruit on auscultation. The neurological findings were normal. A Grade III harsh systolic murmur, which was transmitted widely, was heard over the precordium.

Results of routine studies of blood and urine were within normal limits. The electrocardiogram showed a 1st degree A-V block. Roentgenograms of the neck showed a circular calcification outlining the mass (Fig. 1). Bilateral percutaneous serial carotid angiograms demonstrated a tortuous left internal carotid artery forming a loop at the base of the calcified mass and sending a bulbous projection into its inferior pole (Fig. 2). The right internal carotid artery was quite tortuous without evidence of aneurysmal formation and showed good filling of both anterior cerebral arteries. The electroencephalogram revealed focal slow waves and sharp waves on the left side suggesting a degenerative regional encephalopathy.

Two radioisotopic cerebrograms were performed.12 This procedure involves the rapid release of a radioactive bolus from the arm to the heart by the intravenous injection of a small amount of Hippuran-I20, and results in its simultaneous arrival in each carotid system. The dilution curves are measured by accurately matched scintillation detectors placed over the area of the middle cerebral artery and recorded by a 312-channel analyzer. Diminished blood flow through the region of the middle cerebral artery on the left as compared to the right side was found. When the detectors were placed over corresponding areas in the anterior cervical region, the radioisotope-dilution curves showed a prolongation of flow over the aneurysm.

Operation. On May 17, 1963, the patient was anesthetized and hypothermia to 31°C was induced. The vessel was approached by a long incision anterior to the sternocleidomastoid muscle. A severe fibrotic reaction extended throughout the field of previous exploration, necessitating slow, painstaking dissection (Fig. 3). The hypoglossal, glossopharyngeal and vagus nerves were all enveloped in scar and splayed out over the aneurysm. They were freed by sharp dissection. The internal jugular vein was stretched similarly over the mass and its lumen was obliterated. When the internal carotid artery, both proximal and distal to the mass, was finally freed, it became evident that its marked tortuosity would allow a primary anastomosis. Fifty mg. of heparin were given intravenously. A by-pass consisting of 12-gauge needle and connecting large-bore tubing then was placed through purse-string sutures from
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Fig. 1. Radiograms showing calcific shell of the aneurysm.

the common carotid to the distal internal carotid artery. The aneurysm was excised with 2.5 cm. of uninvolved carotid artery to remove unneeded slack. The vessel itself was remarkably pliable and free of atheromatous involvement except for a small, nonobstructing plaque at the level of the carotid bifurcation. An end-to-end anastomosis with continuous 6-0 arterial silk was accomplished without difficulty. Upon rewarming, the patient responded well, though there was mild weakness of the tongue. Small amounts of Neo-Synephrine were administered as an intravenous drip to maintain normal blood pressure. Four hrs. postoperatively bleeding occurred from the wound in the neck at a time when an excess of the pressor agent had been administered. The clotting time had returned to normal by this time and reexploration of the wound showed no bleeding point.

Fig. 2. Carotid arteriogram demonstrating tortuosity of internal carotid artery, and filling of small patent portion of aneurysm (compare size with calcific outline on Fig. 1).