Surgical Treatment of Extracranial Internal Carotid Artery Aneurysm

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Aneurysms of the extracranial internal carotid artery are rare but can be responsible for severe complications such as rupture, thrombosis, or embolism. Between 1961 and 1985 we operated on 38 aneurysms of the extracranial internal carotid artery in 35 patients, 22 males and 13 females, whose ages ranged from 6 to 73 years. The underlying causes of aneurysm included atherosclerosis (12 cases), fibromuscular dysplasia (eight cases), a congenital defect (five cases), infection (one case), and trauma (six cases); in six cases aneurysm was secondary to spontaneous dissection. Signs of cerebral ischemia were present in 26 (74%) patients and a cervical mass was found in six. The aneurysm was proximal (i.e., below the angle of the mandible) in 16 patients and distal (i.e., above the angle of the mandible) in 22. After resection of the aneurysm, arterial continuity was restored in 37 patients by resection and grafting (12 cases), resection and anastomosis (11 cases), or arteriorrhaphy (14 cases). One death occurred 13 days after operation due to myocardial infarction. Two patients experienced a reversible neurologic event. Transient paresis of cranial nerves was observed in eight patients. During a follow-up period that ranged from 6 to 30 years, four patients were lost to follow-up and 25 patients remained asymptomatic. Three patients had asymptomatic thrombosis of the carotid artery detected at follow-up investigations. The potential risks of cerebral ischemia and rupture and the satisfactory long-term results achieved with surgery are strong arguments in favor of surgical treatment for aneurysms of the extracranial internal carotid artery. (Ann Vasc Surg 1994;8:409-416).

Since the first ligation of the carotid artery for aneurysm by Sir Astley Cooper in 1805, surgery of the carotid artery has come into widespread use. Currently endarterectomy for atherosclerosis of the carotid artery is the most commonly performed operation in vascular surgery. Aneurysm of the carotid artery is rare. Almost any segment of the extracranial internal carotid artery (ICA) can be involved. These aneurysms can be responsible for severe complications such as rupture, thrombosis, or embolism; they are occasionally difficult to identify and require particular restorative procedures because of continuing concern about preservation of arterial continuity.

Immediate and long-term postoperative results in 38 cases of aneurysm of the extracranial ICA were analyzed to define the indications and justify an aggressive treatment policy. Proximal (i.e., below the mandible) and distal (i.e., above the mandible) lesions were analyzed separately because they differ greatly with regard to patient demographics, causes, clinical findings, and above all mode of treatment.

**PATIENTS AND METHODS**

Between 1961 and 1985, 35 patients underwent operation for a total of 38 aneurysms of the extracranial ICA. These included 22 males and 13 females whose mean age was 47 years (range 6 to
73 years). The mean age of patients with proximal aneurysms (PA) was 59 years and of patients with distal aneurysms (DA) was 38 years. The sex ratio within each group was similar. Antecedent hypertension was noted in five cases.

**Clinical Findings**

The circumstances leading to the discovery of aneurysms of the extracranial ICA were variable. In six cases the lesion was discovered by palpation of a pulsatile mass either by the patient himself, family, friends, or the attending physician. The mass was cervical (four PAs) or endobuccal (two DAs). In six cases the aneurysm developed secondary to craniofacial trauma that was not always violent. In one case the aneurysm was discovered because of cervical compression giving rise to dysphonia and dysphagia.

Signs of cerebral ischemia were present in 26 patients (74%) either initially (22 cases) or following trauma (four of six cases). These included five patients with a residual deficit following a stroke, 19 patients with transient ischemic attacks, and two patients with epilepsy.

Clinical examination revealed a carotid bruit in six cases. A peripheral neurologic deficit was found in six cases, including four involving the hypoglossal nerve XII and two cases of Horner’s syndrome.

**Aneurysm Characteristics**

Causes of aneurysm varied and included six cases of dissecting aneurysm secondary to contusion or cervical elongation, 12 cases of atherosclerosis, eight cases of fibromuscular dysplasia, five cases of congenital aneurysm, one case of infection, and six cases of spontaneous dissection (Fig. 1).

The aneurysm was located below (proximal) or above (distal) the angle of the mandible in 16 and 22 cases, respectively. The cause of the aneurysm differed according to the site inasmuch as all aneurysms attributed to atherosclerosis were proximal and most other causes were traced to distal aneurysms (Table I).

All three types of aneurysm (saccular, fusiform, and dissecting) were observed (Table II). The aneurysm was bilateral in three patients (one PA and two DAs). Contralateral fibromuscular dysplasia or dolichocarotid artery was present in four cases.

**Surgical Treatment**

Each aneurysm was approached according to its site and the morphology of the patient. Fourteen