Chapter 14
Extracranial Carotid Artery Aneurysms

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Aneurysms of the extracranial carotid artery are rare and account for less than 1% (0.3–0.6%) of all arterial aneurysms. The aneurysm is most often located in the common carotid artery (CCA) and the internal carotid artery (ICA) junction. The mid to distal ICA is the second most common location of such aneurysms. Atherosclerosis is by far the most common cause, but fibromuscular dysplasia (dysplastic) trauma and prior surgical intervention, congenital anomaly and infection can result in the formation of true carotid aneurysm as well as pseudoaneurysm.

Extracranial carotid aneurysm can be fusiform or saccular. Fusiform carotid artery aneurysms are often bilateral and degenerative in etiology and are located near the carotid bifurcation. Saccular aneurysms are more often unilateral and occur in the midsegment in the ICA in the neck. Pseudoaneurysm results from the disruption of the vessel wall, usually occurring at the site of patch grafting secondary to infection of the prosthetic patch, arterial dissection, and/or blunt/penetrating carotid artery trauma.

Patient may present with asymptomatic neck mass or symptoms of TIA or stroke secondary to embolization. Large aneurysms may cause compression of the surrounding nerves and upper aerodigestive tract. Dysphagia, headache, occipital pain, and retro-orbital pain may occur. Patient may present with Horner syndrome or voice hoarseness. Tracheal compression from ruptured carotid aneurysm can result in airway compromise.

On physical examination, a pulsatile mass in the neck may be palpable. Patient should undergo carotid duplex study followed by CT angiography of the neck. Catheter-based carotid/cerebral arteriography is often helpful in evaluating crossover intracranial circulation in the event: ICA ligation may become necessary in patients with inaccessible location of the aneurysm.

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Operative Repair

The primary aim of the treatment is resection of the aneurysm and maintaining the flow through the ICA. The incision in the neck is like the one used for carotid endarterectomy (see Chap. 17). The internal jugular vein is mobilized after ligating and dividing of its branches. The hypoglossal vagus nerve and, in patiens with aneurysms extending cephalad, glossopharyngeal nerve are preserved if the dissection extends close to the stylohyoid muscle and the stylohyoid process.

During preoperative planning, if there is any concern for the necessity of exposure of the distal ICA, a mandibular subluxation should be considered, and patient should have nasotracheal intubation and have an ENT surgeon or a maxillofacial surgeon available for performing the subluxation (Figs. 14.1 and 14.2). Mandibular subluxation helps in obtaining distal exposure, which otherwise, may not have been be possible in patients with large aneurysms extending towards the base of the skull.

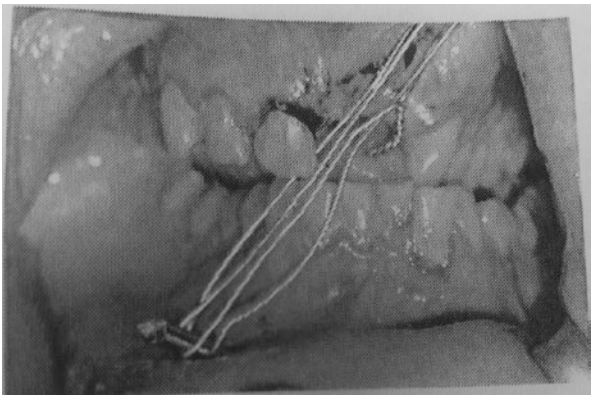

Fig. 14.1 Intraoral wiring for mandibular subluxation

Fig. 14.2 Nasotracheal intubation with mandibular subluxation

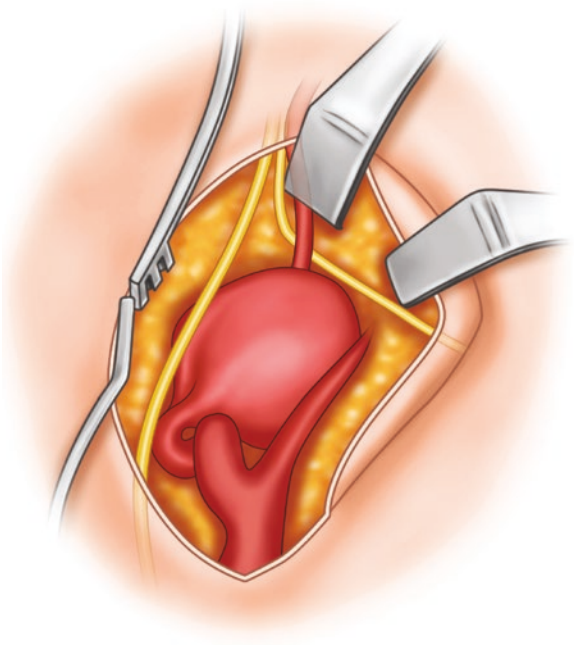

Fig. 14.3 Internal carotid artery aneurysm and its relationship to the vagus nerve with Hypoglossal nerve seen cephaled near the two retractors

Intraoperative shunting is rarely necessary. EEG monitoring, median nerve evoked potentials, and back pressure of the ICA are necessary if shunt placement is required. Heparin is administered intravenously by the anesthesia to keep the ACT 250–300 s. After mobilization of the carotid bifurcation in patients with mid-ICA aneurysms, the external carotid artery (ECA) is looped with a silastic loop and is pulled with the tape caudally. The internal carotid artery with the aneurysm is very carefully mobilized, and this mobilization helps in obtaining distal exposure of the ICA (Fig. 14.3).

Small aneurysms with redundant ICA can be resected in an end-to-end anastomosis performed using 6-0 or 7-0 cardiovascular polypropylene suture (Ethicon, Somerville, NJ). The internal carotid artery should be spatulated so that an end-to-end (functional side-to-side) anastomosis is performed (Figs. 14.4 and 14.5).

Partial resection of the aneurysmal wall with patch angioplasty using prosthetic patch is another option available in patients with anatomically high lesions. All the thrombotic material in the aneurysm should be carefully removed in such instances. In most patients, the anterior wall of the aneurysm should be resected to prevent injury to the nerves lying posterior to the aneurysm.

In some patients, interposition grafting may be necessary A synthetic graft (ringed PTFE WL Gore, Newark, DE) should be considered. A greater saphenous vein or superficial femoral artery harvested from the groin and upper thigh can also be used as a conduit following resection of the aneurysm. In mycotic aneurysms involving CCA/ICA, autologous conduit is preferred. In patients with large extracranial ICA aneurysm extending to the base of the skull, ICA ligation may be the

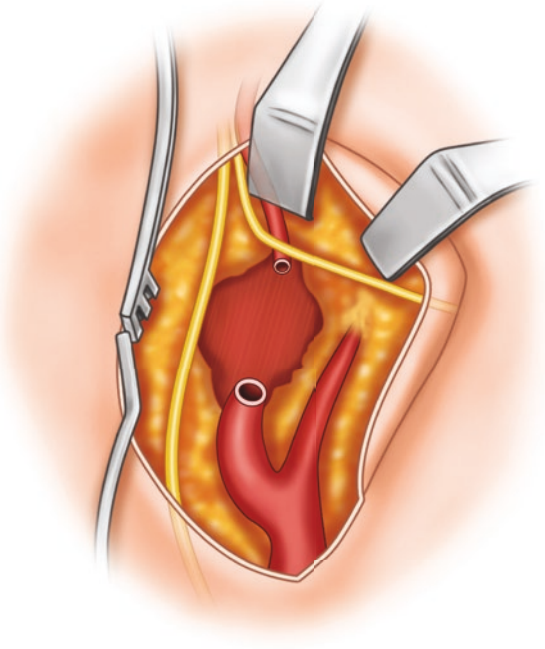

Fig. 14.4 Resected ICA aneurysm

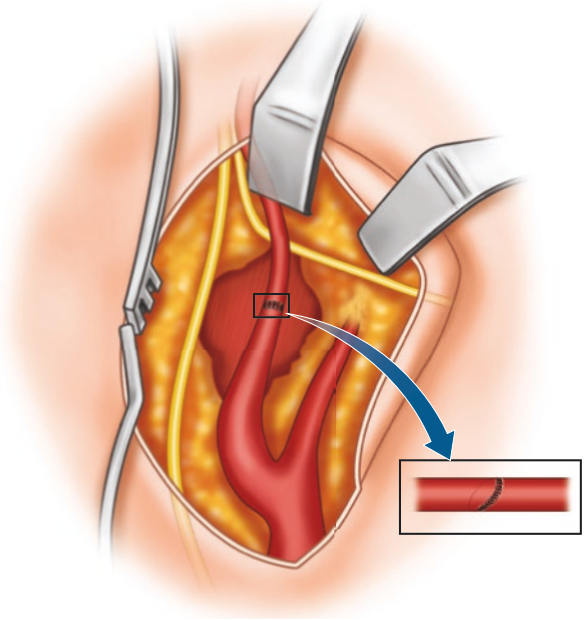

Fig. 14.5 Spatulated end to end ICA anastomosis following resection of ICA aneurysm. Hypoglossal nerve is placed behind the ICA

only option available for repair. Preoperative arteriography and intermittent balloon occlusion of ICA at its origin should be performed to evaluate the cross circulation in the circle of Willis. This treatment option is rarely necessary, as in most patients, arterial reconstruction following resection of the carotid aneurysm is feasible.

Complications

The most common complication of carotid artery aneurysms repair is cranial nerve injury. Perioperative stroke is the second common complication.