Carotid Endarterectomy – by Neurosurgery Faculty (vs vascular)

Purpose: CEA is frequently used to treat severe atherosclerotic occlusive disease involving the internal carotid arteries at the common carotid artery bifurcation. Atherosclerotic carotid artery disease commonly causes thromboembolic or hemodynamic stroke and TIA. Recent studies proved the efficacy of this operation compared with medical treatment for symptomatic high-grade stenosis (70-99%), symptomatic moderate stenosis (50-69%), and asymptomatic high-grade stenosis (>/=60%).

Length: 3-4 hrs

Anesthetic considerations:

Medications:

- Drips: one Alaris brain: carrier, neo gtt, nitroglycerin gtt, +/- esmolol gtt
- Uppers: neo gtt
- Downers: typically nitroglycerin gtt due to concomitant CAD, can also use sodium nitroprusside or clevidipine
- Preop: Midazolam 1-2 mg per anesthesiologist's discretion
- Induction: Fentanyl 2-5 mcg/kg, Propofol 1-2 mg/kg (carefully titrated, consider Etiomidate if pt is hemodynamically unstable or has poor cardiac function), rocuronium 0.6 mg/kg
- Maintenance: iso or sevo + remi gtt + nitrous; if history of PONV consider Propofol gtt 50 mcg/kg/min instead of nitrous; low dose NTG may be benficial for pts at high risk for MI; Propofol bolus to produce burst suppression on EEG (usually 0.5-1 mg/kg) just prior to cross-clamping for cerebral protective effects.
- Other drugs: Heparin, Protamine, Cefazolin 2000 mg unless allergy or otherwise indicated; IV Tylenol, Ondansetron, Fosaprepitant (Emend) 150 gm IV (ordered from pharmacy if history of PONV)
- Emergence: 10 min after cross-clamping and once bleeding from arteriotomy has been controlled, protamine (verify dose with surgeon) should be administered slowly (at least over 10 min) via intravenous route (see CEA dog study under literature tab); HTN is likely as patient ermeges from anesthesia, have NTG and esmolol gtts available; can also consider titrating in labetolol or metoprolol to wean patient from drips.

Temperature/Monitors:

- Esophageal temperature probe
- Arterial line, consider pre-induction if CAD or poor cardiac function
- Standard ASA monitors (consider EASI ECG lead placement see "easi_vs_conventional_ecg" under literature section)
- iStat and ACT cartridges

- 1 large bore PIV 16G+

Hemodynamic Goals: maintain MAP slightly above or equal to patient's baseline MAP to preserve perfusion

Other considerations: total carotid occlusion time should be noted on the anesthetic record, neuromonitoring usually present, cerebral oximetry may be a useful adjunct

Complications: circulatory instability, bleeding, HTN, MI, stroke, loss of carotid body function, respiratory insufficiency, tracheal compression, vocal cord paralysis, tension PTX, hematoma

Surgical Approach:

- Involves opening the common carotid artery and proximal internal carotid artery in the neck, removing the atherosclerotic plaque from the inside of the artery, and repairing the wall of the artery (media and adventitia).
- Opening the carotid artery requires temporary occlusion of the proximal common carotid artery, distal internal carotid artery, external carotid artery, and usually its first branch the superior thyroid artery.
- The entire procedure can be achieved under continued occlusion of these vessels if the collateral blood flow to the territory supplied by the occluded ICA is adequate (on the basis of intraop EEG monitoring, ICA back-bleeding, stump pressures, CBF studies, or angiography)
- Alternatively, a shunt between the proximal common carotid artery and distal internal carotid artery can be placed after the arteriotomy for use during the endarterectomy.
- Often a synthetic Dacron graft or occasionally a vein graft is used to reconstruct the arteriotomy site and increase the luminal diameter