Techniques of carotid endarterectomy

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Case presentation

- 69 year old man
- Complete occlusion of the RICA, severe stenosis of the LICA
- PMHx: CAD s/p stent x2, HLD, CKD, TIA
- SHx: 40 pack year smoking history
- Meds: ASA, plavix, lisinopril, metoprolol, isosorbide, pravastatin, zetia
Surgery

- general anesthesia
- EEG and SSEP monitoring
- eversion carotid endarterectomy
Surgery

- general anesthesia
- EEG and SSEP monitoring
- eversion carotid endarterectomy
- OR time 3:11, EBL 200 cc, crystalloid 2L, UOP 200 cc
Hospital course

- Immediate post-op: moving all extremities, combative
- POD #1: aspirated, coded, re-intubated
- POD #3: extubated
- POD #5: transferred to floor, PT
- POD #7: discharged home
- Vascular clinic 1 month post-op: no issues
By the end of this lecture, you should be able to …

- describe the etiology of carotid disease
- list the diagnostic modalities for evaluation
- define the indications for surgical intervention
- discuss the treatment options for carotid disease
- compare the two major CEA techniques and describe the individual techniques
Etiology

- 3rd most common cause of death in the US
- ~800,000 strokes/year, ~35% death/disability
- 85% ischemic, 30% of which due to carotid disease
- First endarterectomy: DeBakey 1954
• turbulent flow
• atherosclerosis
• intimal injury
• platelet deposition
• smooth muscle cell proliferation
• fibroplasia
• atheroemboli
Diagnosis

- Carotid duplex US - anatomy, flow velocities
- CT/MR angiography - aorta, tortuosity, stenosis
- conventional angiography
Medical treatment

- lifestyle modification
- ASA
- Plavix
- Statins
Surgical indications: asymptomatic

- Asymptomatic Carotid Atherosclerosis Study (ACAS)
- Asymptomatic Carotid Surgery Trial (ACST)
- ≥60% stenosis, risk reduction of stroke is 5.4-5.9%
Surgical indications: symptomatic

- North American Symptomatic Carotid Endarterectomy Trial (NASCET)
- 50-69% stenosis, risk reduction of stroke is 6.5%
- ≥70% stenosis, risk reduction of stroke is 17%
Surgery

Internal carotid artery
Facial vein
Internal jugular vein
External carotid artery
Omohyoid muscle
Common carotid artery
Incision
Eversion
# Eversion technique

## Advantages
- Prevents longitudinal arteriotomy
- No patch
- Corrects for elongated ICA
- Associated with lower restenosis rates

## Disadvantages
- Difficult to visualize endarterectomy endpoint
- Difficult to shunt
- Distal intimal flap
Eversion versus conventional carotid endarterectomy: Late results of a prospective multicenter randomized trial

Piergiorgio Cao, MD, Giuseppe Giordano, MD, Paola De Rango, MD, Simona Zannetti, MD, Roberto Chiesa, MD, Gioacchino Coppi, MD, Domenico Palombo, MD, Flavio Peinetti, MD, Carlo Sartera, MD, Vincenzo Stancanelli, MD, Enrico Vecchiati, MD, and Collaborators of the EVEREST Study Group, Perugia, Milan, Modena, Aosta, L’Aquila, Ravenna, and Reggio Emilia, Italy
1353 patients; Oct 1994 - Mar 1997; Mean follow-up 33 months

Eversion (678) vs standard (675 primary and patch) CEA

Primary outcomes

Restenosis: 19 eversion vs 37 standard

no significant difference in cumulative risk of stroke: eversion 3.9% vs standard 2.2% (p=.2)

no significant difference in death: eversion 13.1% vs standard 12.7% (p=.7)
What about stenting?

- Carotid Revascularization Endarterectomy Versus Stenting Trial (CREST)
  - 1.5-2x ↑ periprocedural stroke
  - ~2x ↓ periprocedural MI
  - soft indications: hostile neck, high/low lesions


Indications for CEA include all of the following EXCEPT:

a. 60% left ICA stenosis with TIA of the right arm/leg
b. 80% right ICA stenosis, no symptoms
c. 55% left ICA stenosis, no symptoms
d. 50% right ICA stenosis with left hemiparesis
e. 99% left ICA stenosis with aphasia
Indications for CEA include all of the following EXCEPT:

a. 60% left ICA stenosis with TIA of the right arm/leg
b. 80% right ICA stenosis, no symptoms
c. 55% left ICA stenosis, no symptoms
d. 50% right ICA stenosis with left hemiparesis
e. 99% left ICA stenosis with aphasia