Carotid Artery Endarterectomy vs. Stenting

A study of treatment choices in carotid vascular disease
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Carotid Vascular Disease

- **Signs/symptoms:**
  - TIA (Transient Ischemic Attacks)
  - RIND (Reversible Ischemic Neurologic Deficit)
  - Amaurosis fugax: transient blindness in one eye.
  - CVA (Cerebrovascular accident): neurologic deficit with permanent brain damage

- **Risk factors:**
  - HTN
  - Hyperlipidemia
  - Smoking

- **Outcome: stroke, death**
  - Mortality from an acute event is 20%
  - 50% of the patients are alive 5yrs post event.
Evaluation options

- Duplex Doppler ultrasonography
- Carotid Doppler ultrasonography
- Magnetic resonance angiography (MRA)
- Carotid angiography (gold standard)
  - Not done as often because this is an invasive procedure associated with risk of ischemic/hemorrhagic event
- Sensitivity/specificity of noninvasive tests to predict stenosis >70% is 83-86%/89-94%
To Screen or Not to Screen
Current recommendations

- USPSTF: recommends against screening for asymptomatic carotid artery stenosis in the general populations
- American Heart Association/American Stroke association: screening is unlikely cost effective.
- The American Society of Neuroimaging: Screening for general population is not recommended but may be considered for patients older than 65 years with risk factors of vascular disease.
WHO TO TREAT

- Treatment recommended for:
  - Asymptomatic pts with >60% stenosis
  - Symptomatic pts with >50% stenosis
Carotid Artery Endarterectomy

- Performed through neck incision, usually along sternocleidomastoid muscle
- Proximal and distal control of artery is obtained
- While patient is heparinized, internal and external carotid arteries are clamped
- Longitudinal arteriotomy is performed, carotid plaque is removed, and vessel is closed over a patch
Carotid Artery Stenting

- Catheter with umbrella tip is inserted through the femoral artery
- Balloon is inflated to dilate artery
- Stent is placed in artery to maintain patency
- Filters are used to capture embolic particles
Direct comparison of CEA vs. Stenting

- Several studies exist comparing the efficacy/safety of CEA to stenting.
- Studies are designed to look at post-procedure outcome. (i.e. stroke, embolism, hyperperfusion injury, etc.)
Direct comparison of CEA vs. Stenting

- WALLSTENT trial
  - N: 219 patients
  - Carotid arteries were 60-90% occluded
  - Patients randomly assigned to treatment group
  - 1-yr follow-up: significantly higher rate of post-procedure stroke with angioplasty and stenting group compared to CEA group (12.2 vs 3.6%)

- SAPPHIRE STUDY
  - N: 334 patients
  - Symptomatic carotid stenosis of ≥50% or asymptomatic stenosis of ≥80%
  - Looking for end point of major cardiovascular disease within 1 year.
  - Result: major cardiovascular disease was more common in CEA patients. However revascularization was less necessary in CEA patients.
CEA vs stenting in elderly patients

- Retrospective study of pts ≥75 years old
- N: 53 pts
- Primary outcome: MI, stroke within one month of treatment
- Incidence of stroke within 30 days of treatment was higher in stenting than in CEA group (11.3% to 1.8%, P<0.05)
- in stenting group (7.5% vs 0%, P<0.05)
- Protective embolic filter devices were used in this trial
Meta-analysis of CEA vs. Carotid artery stenting

- Number of trials: eight
- Total N: 2942
- Outcome: stroke/death/MI at 30 days and 1 year post procedure
- Result: The rates of stroke did not differ significantly between CEA and CAS. However, the relative risk of MI was significantly higher in CEA patients. Re-stonesis after 1 year occurred more often in CAS patients.
CaRESS: 4 year outcomes

- **N**: 397 patients
- **Study** looked at outcomes 4 years post procedure
- **Endpoints evaluated:**
  - **Primary:** mortality, stroke and MI
  - **Secondary:** re-stenosis, repeat angiography and carotid revascularization
- **Results:**
  - **Primary endpoints:** No significant difference between CEA and CAS
  - **Secondary endpoints:** CAS resulted more often in need for repeat procedure due to restenosis
CONCLUSION

- Looking at patient population as a whole without risk stratification.
  - CEA and CAS have equality related to primary outcomes such as death, stroke and MI.
  - CAS carries an increased risk of repeat stenosis
CONCLUSION

- Patients with significant comorbidities who are poor surgical candidates are more likely to benefit from angioplasty and stenting than CEA.
- In considering elderly patients there is an acute (<30 days) increased risk of stroke following stenting (not seen in CEA).
- Embolic filters improve the outcomes of patients undergoing angioplasty and stenting.
References

QUESTIONS?