Disclosures

- None
Stroke in 2014

- Stroke kills almost 130,000 Americans each year—1 out of every 19 deaths.
- On average, one American dies from stroke every 4 minutes.
- Every year, more than 795,000 people in the United States have a stroke.
- About 610,000 of these are first or new strokes—about 185,000 strokes—nearly one of four—are in people who have had a previous stroke.
- About 87% of all strokes are ischemic strokes.

Impact of Stroke

- Stroke costs the United States an estimated $36.5 billion each year. Cost includes health care services, medications to treat stroke, and missed days of work.
- The mean lifetime healthcare expenditure is $140,000 per patient
- Only 50-70% of stroke survivors regain functional independence.
Epidemiology

- Men = Women
- More prevalent in less educated individuals
- Native Americans, African Americans, and multiracial individuals more affected than whites
- Asians and Hispanics similar to whites
- Geographic diversity
Ischemic Stroke

- 14.5% Atherosclerotic disease (50% extracranial, 50% intracranial)
- 19.6% Lacunar
- 19.6% Cardioembolic
- 1% Miscellaneous
- 45% Unclear etiology

History

- First described in 1875 by Gowers
- 1905 Chiari described an autopsy with carotid plaque ulceration with cerebral embolization
- 1935 Moniz described the use of angiography to identify carotid pathology before death
History

• 1955 Carrea performed ECA to ICA anastamosis for symptomatic CCA occlusion

• 1954 resection of diseased portion with primary anastamosis

• 1953 Debakey performed first CEA-published in 1975; Rowe performed in 1955, Cooley in 1956

History

• First large study regarding CEA-Joint Study of Extracranial Carotid Artery Occlusion

• 22 years later (1991), North American Symptomatic Carotid Endarterectomy Trial (NASCET)

• 1991-European Carotid Surgery Trial (ECST)

• 1995-Asymptomatic Carotid Atherosclerosis Study (ACAS)
History

- 1980- First carotid angioplasty by Kerber
- 1989- First carotid stent placed
- 2004- FDA approves carotid stenting
- 2004- Stenting and Angioplasty with Protection in Patients at High Risk for Endarterectomy trial (SAPPHIRE)
- 2012- Carotid Revascularization Endarterectomy versus Stent Trial (CREST)

Carotid Artery Intervention

- Purpose of carotid artery intervention is stroke prevention
Indications for Imaging

• Symptomatic:
  • Contralateral weakness of face, arm, leg, or combination
  • Contralateral sensory deficit of face, arm, leg, or combination
  • Transient ipsilateral blindness (amoebrosis)
  • Right hemisphere: anosognosia, asomatognosia, neglect, visual or sensory extinction
  • Left hemisphere: aphasia, alexia, anomia, and agraphesthesia

• Asymptomatic:
  • Bruit
  • Any clinically significant PVD regardless of age
  • Patients >/= 65 with one or more of the following risk factors:
    • CAD
    • Current smoker
    • Hyperlipidemia
    • Pre-operative evaluation for CABG

Imaging Modalities

• Carotid duplex
• CTA
• MRA
• Conventional angiography
Medical Management

- Aspirin
- Statin/treatment of hyperlipidemia
- Treatment of hypertension
- Treatment of diabetes
- Tobacco cessation

Surgical Management

- Carotid endarterectomy
- Carotid Stenting
NASCET Criteria
ACAS

- Patients with asymptomatic carotid artery stenosis of 60% or greater reduction in diameter
- “Good candidate for elective surgery”
- Carotid endarterectomy performed with less than 3% perioperative morbidity and mortality is added to aggressive management of modifiable risk factors
- Reduce 5-year risk of ipsilateral stroke

CREST

- Landmark, prospective randomized controlled trial comparing carotid artery stenting (CAS) to carotid endarterectomy (CEA)
- 2500 patients
- RX Carotid Stent System and RX Accunet Embolic Protection System
CREST

- Symptomatic patients with >70% stenosis by duplex U/S or >50% by angiogram

- Asymptomatic patients with >70% stenosis by duplex U/S or >70% by angiogram

- Primary endpoint: composite of death, any stroke, or MI at 30 days, plus ipsilateral stroke to one year

- Non-inferiority trial

CREST

- CAS is not inferior to CEA

- Higher rate of stroke in CAS patients >70 years old

- ? benefit of CAS over CEA in patients <70 years old
“It was a great effort to get to an 18-point turnaround.”

—Allison McNeill

**Carotid Artery Intervention**

- Purpose of carotid artery intervention is stroke prevention
Indications for Intervention

- Symptomatic disease
- Asymptomatic disease

Indications for CEA

- Symptomatic patients with >50% stenosis
- Asymptomatic patients with >60% stenosis (with acceptable operator risk)
Indications for CAS

- Symptomatic AND:
  - Patients “high risk” for CEA:
    - Anatomic:
      - Lesion location-proximal or distal
      - Reoperation after previous CEA
      - Existence of a cervical stoma
      - History of neck radiation with local fibrotic changes
      - Previous ablative neck surgery
    - Patient specific:
      - Very subjective
      - Cardiac, pulmonary or renal disease

Contraindications for CAS

- Lesion characteristics:
  - Soft “lipid-rich” plaque
  - Long lesion - >15 mm or more
  - Preocclusive lesion
  - Circumferential calcification
- Anatomic considerations:
  - Aortoiliac tortuosity
  - Sharply angulated aortic arch
  - Carotid tortuosity or angulations near the lesion
  - Atherosclerotic/atheromatous arch
- Patient considerations:
  - Chronic kidney disease
Future Studies

• Utility of CAS in asymptomatic patients

• New studies regarding medical vs surgical (CEA and CAS) management of both symptomatic and asymptomatic disease

Questions??
Carondelet Heart & Vascular Institute. Be well.