POST STROKE RISK FACTOR MODIFICATION

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Sacred Heart Riverbend
• Nothing to Disclose
Current Stroke Statistics

• Each year approximately 795,000 people each year have a stroke
• 87% of those are ischemic stroke
  – 130,000 will die
  – One every 4 minutes
• Stroke is 4th leading cause of death in the US
• Leading cause of serious disability in the US
• 185,000 will have had a prior stroke
Percentage breakdown of deaths attributable to cardiovascular disease (United States: 2010).

Go A et al. Circulation 2014;129:e28-e292
Etiology of stroke

- Hemorrhagic
- Embolic
- Artery to Artery
- Lacunar
- Cryptogenic

- Stroke is defined by symptoms >24 hours, or imaging of acute brain lesion if symptoms vanish
Cerebral Perfusion

Before treatment

After treatment with t-PA
Risk for Stroke

- Hypertension
- Diabetes
- Hyperlipidemia
- Atherosclerotic disease
- Smoking
- Alcohol consumption
- Ethnicity
  - Black, Native American, Alaska Natives
- Family History
- Atrial Fibrillation
- Oral Contraceptives
- Heart Disease
- Prior TIA hx
- Obesity
- >65 years of age
- PRIOR STROKE
Proportion of patients with recurrent stroke within 5 years after first stroke.

Go A et al. Circulation 2014;129:e28-e292
Annual age-adjusted incidence of first-ever stroke by race.

Go A et al. Circulation 2014;129:e28-e292
Annual rate of first cerebral infarction by age, sex, and race (Greater Cincinnati/Northern Kentucky Stroke Study: 1999).

Go A et al. Circulation 2014;129:e28-e292
Estimated 10-year stroke risk in adults 55 years of age according to levels of various risk factors (Framingham Heart Study).

Go A et al. Circulation 2014;129:e28-e292
Hemorrhagic

• Intracranial Hemorrhage
  – Accidental- secondary to fall or injury
  – Spontaneous- secondary to hypertension, aneurism or vessel injury
Factors Associated With Red Infarcts (Hemorrhagic Transformation)

- Size of the infarct - bigger infarcts have a higher chance of becoming hemorrhagic
- Richness of collateral circulation
- Use of anti-coagulants
- Treatment with thrombolytic agents
Embolic Stroke

• Cardioembolic 14-30% of ischemic strokes
• Key Identifiers:
  – Abrupt onset
  – Valsalva maneuver, co-occurrence of other embolism
• Atrial Fibrillation (nonvalvular-50%, valvular 25%)
  – Risk of Stroke with A-fib varies based on other co-morbidities
  – CHADS2 gives some direction (age, HTN, CHF, DM, Prior stroke)
• Recent MI
  – Left ventricular mural thrombus 60% associated with recent MI
  – Chronic ventricular dysfunction, CAD, CHF, Dilated Cardiomyopathy
• PFO-Patent Foramen Ovale
• Endocarditis
• Valvular disease- mechanical valve, mitral rheumatic stenosis
Cerebral Embolism Sources

- Large cervical arteries
- Pulmonary veins
- Lungs
- Heart valves
- Endocardium
- Paradoxical embolism
Secondary Prevention of Embolic strokes

• Early identification of Source
  – Transthoracic Echocardiogram
    • LA size, LV systolic func, cardiomyopathies
  – Transesophageal Echocardiogram
    • Aortic arch, ascending aorta, LA, LA appendages, intra-arterial septum
  – Telemetry
  – Holter Monitor
  – Asymptomatic Event Monitor
Medication to prevent Embolic Stroke

- Consideration must be made for bleeding risk prior to initiation of meds
- Early initiation of Anticoagulant therapy
  - Consideration for hemorrhage based on size of stroke
- Low Molecular weight heparin: enoxaparin
- Vitamin K antagonist: warfarin-monitor INR goal 2.0-3.0
- Factor Xa meds: dabigatran, rivaroxaban, apixaban
  - Combination ASA, Plavix studies and proven less effective
  - Only approved for atrial fibrillation
- Anticoagulation for Valvular disease or Cardiomyopathy is dependent upon what valve is involved and degree of disease
Thrombotic Stroke

- Atherosclerosis: the commonest pathology of vascular obstruction leading to thrombosis
- Other pathological causes:
  - Fibro muscular dysplasia
  - Arteritis (Giant Cell & Takayasu)
  - Dissection of vessel wall and hemorrhage into atheromatous plaque
  - Hypercoaguability
Artery to Artery Stroke

• Embolic Stroke from Ulcerated Plaque site
• Large Vessel Thrombosis
  – Carotid Plaque
  – Aortic Arch
Treatment of Artery to Artery Stroke

• Identify area of vessel injury
• Control Cholesterol
• Consider Surgical Intervention
  – Large Vessel Stenosis
• Antiplatelet agent
  – ASA or Plavix
Intracranial Atherosclerotic Disease

- SAMMPRIS Trial - Medical management was superior to surgical intervention/endovascular procedures
- 30 day stroke risk
  - 14.7% in PTAS group
  - 5.8% in Medical management group
  - 30 days
    - Equal risk 13 Pts. in ea. group
Lacunar Stroke

• Gradual onset – symptoms may wax and wane
  – Pure sensory hemiparesis
  – Pure motor hemiparesis
  – Sensory motor
  – Ataxia hemiparesis
  – Dysarthria/clumsy hand

• Intracranial Atherosclerotic disease
Ischemic Stroke Due To Hemodynamic Crisis: “Hypotensive Stroke”

- Any event causing abrupt drop in blood pressure results in critical compromise of CBF (cerebral blood flow) and hence cerebral perfusion.
- Sites affected by critically low CBF are located at the end of an arterial territory. Hence the term “watershed or boundary zone infarct.”
Cryptogenic

• Cannot be attributed to a specific causative factor
Hypertension management

• 30-40% reduction in stroke risk with BP lowering

• Absolute target is not yet defined
  – UKPDS defined as <144/82

• Specific agent may not make a difference
  – May vary most based on secondary disease, i.e., CAD or DM

• Prevention of primary and secondary stroke risk
Diabetes Management

• 15-33% of ischemic stroke Pts. have DM
  – Depending on which study

• Most of the available data is in regards to primary stroke, not secondary
Lipid Management

- HPS-Heart protection study proved reduction in CV disease with LDL<70
- SPARCL-Stroke Prevention by Aggressive Reduction in Cholesterol Levels Study
  – Showed 16% reduction in fatal or nonfatal stroke
- NCEP guidelines suggest control through diet and medication management
Cigarette Smoking

- Strong evidence exists that smoking is an independent risk factor for stroke
- May be risk of secondary smoke inhalation
- Advise to Pts. to avoid smoking and second hand smoke exposure
Alcohol consumption

• Light to Moderate ETOH consumption may reduce risk for stroke
  – <1/day

• Excess ETOH consumption increases risk of stroke and brain atrophy
  – >5/day
  – May cause hypercoagulability, reduced blood flow and atrial fibrillation
Large Artery Disease

- Symptomatic Carotid Stenosis
  - <50% no benefit to surgery
  - 50-69% uncertainty
  - No benefit with carotid occlusion or stenosis distal to the bifurcation
  - Current studies suggest better success with CEA-vs.-CAS (Carotid Endarterectomy-vs.-Carotid Artery Stenting)
    - Benefits were shown with severe stenosis, >75yo, men, recent stroke, hemispheric symptoms
    - Better outcomes with Intracranial stenosis, absence of white matter disease and the presence of collaterals
Intracranial Atherosclerosis

• High risk for recurrent stroke
• Current literature supports medical management as more effective and safer than intracranial Stenting procedures
• 1995-WASID – Proved better outcomes with ASA over warfarin in prevention of stroke associated with ICAS
• 2006-SPARCL - Aggressive treatment of ICAS with Atorvastatin 80mg/day reduced risk of recurrent stroke by 21%
• 2011-SAMMPRIS – ASA, Plavix, Statin
Other Conditions

- Carotid or Vertebral dissection should be treated with warfarin for 3-6 months
- PFO
  - Current treatment is antiplatelet agent and avoidance of clot creating risk. No clear data for closure.
  - Hydration, mobility,
Clopidogrel vs. ASA

- ASA 50-1300mg
  - Low dose had equal efficacy with less risk
- Generally clopidogrel had equal efficacy to ASA except those Pts. with pre-existing ischemic stroke or MI
- Combination therapy is not usually recommended due to risk of hemorrhage
The effect of acute increase in urge to void on cognitive function in healthy adults.

Lewis MS¹, Snyder PJ, Pietrzak RH, Darby D, Feldman RA, Maruff P.

Abstract

AIMS: In healthy adults, voluntary inhibition of micturition is associated with an increasing sensation in the urge to void and pain, and acute pain has been associated with transient deterioration in aspects of cognitive function.

METHODS: Eight healthy young adults consumed 250 ml of water every 15 min until they could no longer inhibit voiding. Performance on standardized measures of cognitive function was measured at hourly intervals which were classified as baseline, when individuals reported an increase in the urge to void, a strong increase in the urge to void, an extreme increase in the urge to void and postmicturition.

RESULTS: Sensations of the urge to void and pain increased with time of inhibition of urge to void and with amount of water consumed. Having an extreme urge to void exerted a large negative effect on attentional and working memory functions (d>0.8). These cognitive functions returned to normal levels after micturition.

CONCLUSION: The magnitude of decline in cognitive function associated with an extreme urge to void was as large and equivalent or greater than the cognitive deterioration observed for conditions known to be associated with increased accident risk.

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PMID: 21058363 [PubMed - indexed for MEDLINE]
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RESEARCH STUDIES:

- **UKPDS** - United Kingdom Prospective Study on Diabetes
- **SPARCL** - Stroke Prevention by Aggressive Reduction of Cholesterol Levels
- **NASCET** - North American Symptomatic Carotid Endarterectomy Trial
- **ECST** - European Carotid Surgery Trial
- Veteran Affairs Cooperative Study Program
- **CAVATAS** - Carotid and Vertebral Artery Transluminal Angioplasty Study
- **SAPPHIRE** - Stenting and Angioplasty with Protection in Patients at High Risk for Endarterectomy
- **CREST** - Carotid Revascularization with Endarterectomy or Stent Trial
- **SAMPRIS** - Stenting versus Aggressive Medical Therapy for Intracranial Arterial Stenosis
- **WASID** - Warfarin Aspirin Symptomatic Intracranial Disease
- **SSYLVIA** - Stenting of Symptomatic Atherosclerotic Lesions in the Vertebral or Intracranial Arteries
- **ACTIVE** - Atrial Fibrillation Clopidogrel Trial with Irbesartan for Prevention of Vascular Events
- **CAPRIE** - Clopidogrel versus ASA in Patients at risk of Ischemic Events