Strokes and TIA’s

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CAT Scan – Acute stroke
Stroke classification

1. ISCHEMIC - 90-95% of strokes
2. HEMORRHAGIC - 5% of strokes; usually related to hypertension
Ischemic CVA etiology – blood clot in artery

- 1. Small vessels – intracerebral disease 50%
- 2. Large vessels - carotid and aortic arch disease 25%
- 3. Cardiac sources 25%
Stroke etiologies
Artery to artery embolus
Heart - stroke link
Extravasation of Microemboli.

Stroke risk factors

1. CVA risk factors similar to cardiovascular risk factors
2. Control of BP most important
3. Diabetics have more strokes
4. Unexplained stroke belt in US
5. Aging populations equates to more strokes
6. Cigarettes
7. Migraine with aura
Stroke and blood pressure
DM and stroke
Increase age and stroke
Stroke Belt
NIH Stroke Scale

1. Eleven categories with 1-4 items/category
   - total 42 points
2. No stroke (score is 0)
3. Minor stroke (score 1-4)
4. Moderate stroke (score 5-15)
5. Moderate/severe stroke (score 16-20)
6. Severe stroke (score 21-42)
NIH Stroke Scale

1. LOC
2. Gaze evaluation
3. Visual (hemianopsia)
4. Facial palsy
5. Motor - arm
6. Motor - leg
7. Limb ataxia
8. sensory
9. Language function
10. Dysarthria
11. Extinction and inattention
TIA (transient ischemic attack)

1. transient neurological symptom
2. symptoms can include slurred speech, numbness or weakness on one side of the body or loss of vision in one eye
3. reversible over a period of minutes to hours, but not days
TIA Basics

1. Is it a TIA? DDX includes seizure, migraine pinched nerve, panic attack etc.

2. TIA vs. stroke - same entity but TIA involves resolution of symptoms (MRI shows infarct in both)

3. TIA causes: Afib, sm.Vessel disease, lg. vessel disease, endocarditis
1. ABCD score
2. age > 60 y/o  1 pt
3. BP > 140 systolic/90 diastolic  1 pt
4. unilateral weakness   2 pts
5. speech disturbance    1 pt
6. DM   1 pt
7. symptom duration > 1 hour   1 pt
1. 6-7 pts. High stroke risk (8%)
2. 4-5 pts. Moderate stroke risk (4%)
3. 0-3 pts Low stroke risk (1%)
Stroke: time-based therapy

1. Most important question: when was last time patient was normal
2. Time of onset 0-3 hrs: use iv TPA
3. Time of onset 0-6 hrs: use intra-arterial TPA (requires neurointerventionist)
4. Mechanical embolectomy – trial data is lacking
MCA embolectomy
Lt. Hemisphere bleed from TPA
TPA clot busting
1. Concept of BP not to high and not too low
2. Edema with acute stroke causes increased perfusion pressure
3. Need higher BP to adequately perfuse brain
4. Lowering BP will increase ischemic penumbra
Low CNS blood flow with lower BP
Impaired CNS perfusion during CVA
Ischemic penumbra
CT and MRI comparison
Perfusion vs. Diffusion
Carotid plaque and stroke
1. Endarterectomy for pts. With symptoms with 70-99% stenosis
2. Little benefit CEA with 50-70% stenosis
3. Consider carotid stenting in high risk patients (MI, CHF, bad COPD etc)
4. Carotid stenosis in asymptomatic patients rarely need surgery
ICA stenosis
Carotid plaque
Carotid artery blockage
Carotid artery disease interventions

- 1. Stenting
- 2. Carotid endarterectomy
Carotid endarterectomy
Carotid Artery blockage corrected after surgery
Carotid Stenting
Bleeding after TPA
Carotid ultrasound
Transcranial Doppler

1. Insonation of intracranial arteries (anterior and posterior circulations)
2. Role in cerebrovascular disease evaluation
3. Assess down stream significance of flow alterations secondary to carotid or vertebral occlusive disease
4. Assess intracerebral artery stenoses
TCD transorbital approach
TCD waveforms in MCA stenosis
Cardiac issues for stroke

1. Study: 231 stroke/tia pts underwent TTE or TEE – 127 had cardiac source of emboli
2. TEE superior to TTE (especially lt. atrial appendage, aortic arch and rt. To lt. shunts)
3. Detecting atrial fibrillation - minimum of 48 hrs monitoring; sometimes 30 day monitoring required
1. risk of stroke in atrial fibrillation
2. patients with hypertension and cardiac pacemaker/defibrillator
3. Patients with increased numbers and increased duration of Afib episodes had increased risk of stroke
4. Pacemaker did not protect against stroke incidence
The Risk of Clinical Atrial Tachyarrhythmias and of Ischemic Stroke or Systemic Embolism, According to the Presence or Absence of Subclinical Atrial Tachyarrhythmias.

Extended monitoring for Atrial Fibrillation
1. Warfarin is drug of choice for cardiac etiologies of stroke
2. INR optimal between 2-3
3. Stroke risk 25% or more with atrial fibrillation
4. Multiple medications interact with warfarin
Anticoagulation benefit in AFib
Anticoagulation benefits in AFib
Risk factors after cardio-embolic stroke
Risk of CNS bleed with coumadin
Blood clot in atrium - stroke cause
Blood clot in atrium
Atrial septal defect
Atrial septal defect
Atherosclerosis of aortic arch
Atrial fibrillation – major cause of stroke
Stroke studies you should know about

1. CAPRIE Trial - plavix
2. ESPS II – Aggrenox
3. MATCH Trial – ASA + plavix risks
4. PROFESS Trial – Aggrenox vs. Plavix
1. Beneficial effects of plavix in myocardial infarction, stroke and peripheral arterial disease
2. As safe as ASA
3. About 8% difference cf. to ASA for secondary stroke prevention
1. Comparison of ASA vs. ASA with delayed release dipyramidole (Aggrenox) vs. placebo

2. Large study > 6,600 pts. – end point of secondary stroke prevention

3. ASA vs. placebo – 18% reduction of stroke or death with ASA

4. Aggrenox vs. placebo – 36% reduction of stroke or death with Aggrenox
MATCH study

1. Comparison of ASA/plavix vs. plavix alone for secondary stroke and TIA prevention
2. No significant difference between ASA/plavix vs. plavix alone for stroke/TIA prevention
3. Markedly increased risk of life threatening hemorrhage (CNS and GI) with ASA/plavix
1. Comparison of Aggrenox vs. Plavix for secondary stroke prevention
2. No statistically significant differences between both drugs
Other drugs for stroke

1. Statins: protective effect even if pt. is euulipidemic
2. ACE inhibitors
3. Folic acid: lowers homocystine
4. Pradaxa etc. in lieu of Warfarin for cardiogenic etiologies
Increased incidence of seizures with increased age
After stroke, 1/3 patients go to SNF, 1/3 home health care, and the remaining to outpatient or inpatient rehab facility. Much better results with early rehab, and the best results are achieved at the inpatient rehab facility.
1. prevention of aspiration
2. medication reconciliation (hospital meds vs. rehab meds vs. home meds)
3. patient education
4. outpatient f/u with PCP and neurologist
Causes of fainting
1. Peri-ventricular white matter disease – significance for strokes is unknown
2. Stroke management in community – only 30-50% of pts. get to hospital within 8 hrs of symptoms
3. Carotid screening in elderly; does it really change anything
4. Cost effectiveness of Plavix and Aggrenox vs. ASA are fairly minimal
Diffusion scan - acute CVA