ISCHEMIC STROKE/ TIA REVIEW

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Definition of TIA and ischemic stroke is based on focal neurologic signs or symptoms referable to known cerebral arterial distributions

TIA and stroke represent different ends of an ischemic continuum

Historically TIA defined as symptoms < 24 hours

MRI positive (DWI) in 30-50% fulfilling that criterion

TIA and minor stroke used interchangeably
5th leading cause of death in US
stroke rate (Medicare patients over 65) declined 40% from 1988 to 2008
Decreased rate of annual recurrent stroke
Women have higher lifetime stroke risk and poorer outcomes
Stroke risk and stroke related death is highest in black population out of all ethnic groups
Stroke belt

Mortality is 20% higher in the stroke belt, identified as North Carolina, South Carolina, Georgia, Tennessee, Mississippi, Alabama, Louisiana, and Arkansas. Within the “buckle” - mortality is higher at 40%.
Ischemic stroke

- About 87% of all strokes are ischemic
- “Time is brain”
- Optimization of systems to improve the “door to needle” time
- Early notification of the receiving hospital
- CT as a first stop
- Limited laboratory test requirements (glucose only unless on anticoagulation)
“LAST KNOWN WELL” is crucial
- recent hospitalizations, surgery, trauma, bleeding
- Anticoagulants? If so need for INR < 1.7
- BP < 185/110 mmHg
Reproducible, reliable, rapid evaluation of a patient with acute stroke.

Measures consciousness, orientation, visual fields, gaze, language fluency and comprehension, speech, sensory loss and neglect, motor strength, and limb ataxia.

Initial measure of stroke severity from 0 (no deficits) to 42 (maximum score).

No minimum score that would exclude eligibility to receive IV rtPA.

Posterior strokes notorious for low NIHSS.
STROKE MIMICS

- Seizure
- Metabolic derangements: hyperglycemia, hypoglycemia, hyponatremia
- Toxins: alcohol, drugs
- Migraine with aura
- Infections from UTI through encephalitis
- Brain tumor
- Psychogenic
better to err on the side of treatment
risk of treating patients with stroke mimics is very low
“healthy brains don’t bleed”
baseline bleeding risk 1.9 %–6.4 %
TIMING

- **0-3 hour window**
  - increases chances of independence at 3 months by $\frac{1}{3^{rd}}$
  - benefits strongest within the first 90 minutes (time dependent)

- **3-4.5 hour window**
  - still not approved by FDA
  - benefit less robust
  - caution in patient >80 years old, with NIHSS >25, h/o diabetes AND stroke, warfarin use
INTERVENTIONAL TREATMENT

- 6 trials confirmed safety and efficacy in well selected patients
  - age > 18 years
  - NIHSS > 6
  - presence of proximal artery occlusion
  - good pre morbid functional status
  - no CT evidence of ischemia
- Safe - risk of ICH 4.4%
- Patients still receive IV tPA
- Window extended for up to 24 hours
SPECIAL SITUATIONS

- Patient on NOAC’s- IV tPA is contraindicated, mechanical thrombectomy tx of choice
- Basilar artery occlusion- mechanical thrombectomy up to 24 hours after onset of symptoms
- Wake up strokes- patient selection based on perfusion studies, DWI MR sequences can identify patients who can be treated safely
Etiology

- Thromboembolic
- Cardioembolic
- Small vessel
- Carotid / vertebral artery dissection
- Cryptogenic
  - ESUS (Embolic Stroke of Unknown Source) - looks embolic however lack of evidence during workup
Vessel imaging - CTA/ MRA/carotid US
Cardiac monitoring
- 30 day cardiac monitor
- Loop recorder
Echocardiogram - TTE with bubble study
TEE of limited utility - highly selected patients
COMPLICATIONS

- **EARLY:**
  - Hemorrhage- symptomatic 6.4 % of IVtPA patients
  - Cerebral edema- 72-96 hours post symptom onset
  - Venous thrombosis- 1st week after stroke

- **LATE:**
  - Depression- 30% of stroke survivors- poorer functional outcomes; fluoxetine possibly improves motor function
  - Sleep disordered breathing- up to 70% of patients- often undiagnosed preexisting condition
SECONDARY PREVENTION

- ASA 75-325 mg /day mainstay of therapy
- ASA/dipyridamole (Aggrenox) – side effects/cost
- Plavix- not superior to ASA
- No evidence for switching from ASA to Plavix or otherwise
- Minor non disabling stroke/ TIA ASA+Plavix for 21 days then ASA only
- Atrial fibrillation
  CHADS2-VASC score
# CHA₂DS₂-VASc for Atrial Fibrillation Stroke Risk

| Congestive heart failure or left ventricular systolic dysfunction | +1 |
| Hypertension history | +1 |
| Age ≥ 75 years | +2 |
| Diabetes history | +1 |
| Stroke, TIA, Thromboembolism history | +2 |
| Vascular disease history | +1 |
| Age 65-74 years | +1 |
| Sex category (female) | +1 |

<table>
<thead>
<tr>
<th>Score</th>
<th>Rate of Thromboembolic Event (per year)</th>
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<tbody>
<tr>
<td>0</td>
<td>1.9%</td>
</tr>
<tr>
<td>1</td>
<td>2.8%</td>
</tr>
<tr>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>3</td>
<td>5.9%</td>
</tr>
<tr>
<td>4</td>
<td>8.5%</td>
</tr>
<tr>
<td>5</td>
<td>12.5%</td>
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<tr>
<td>6</td>
<td>18.2%</td>
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<table>
<thead>
<tr>
<th>Score</th>
<th>Risk</th>
<th>Anticoagulation Therapy Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Low</td>
<td>None recommended or clinical judgement</td>
</tr>
<tr>
<td>1</td>
<td>Low-moderate</td>
<td>Consider antiplatelet or anticoagulation</td>
</tr>
<tr>
<td>≥ 2</td>
<td>Moderate-high</td>
<td>Anticoagulation candidate</td>
</tr>
</tbody>
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SECONDARY PREVENTION

- HTN- goal<140/90 mm Hg in patients with an ischemic stroke,< 130/80 mm Hg if small vessel etiology
- DM- HbA1c < 7 mg%
- LIPIDS- high intensity statin/ goal LDL< 70 mg%
- Smoking
- Exercise- 3-4 sessions of moderate- to vigorous-intensity aerobic exercise per week (40 minutes)
- Diet- Mediterranean diet, DASH diet
Carotid stenosis

- early (within 2 weeks) carotid revascularization for SYMPTOMATIC > 50% stenosis
- CEA superior to stenting for patients > 70 yo
- CAS for patients with contralateral occlusion, h/o CEA, h/o neck irradiation, high cardiovascular risks
- old data suggest benefit of CEA for ASYMPTOMATIC high grade stenosis- no recent validation or comparison of stenting versus surgery or medical therapy
Prevention of childhood obesity

Life’s simple 7 promoted by American Heart Association can lead to 70-80% lower chance of stroke

Oral contraceptives increase by 1.7-2.0 especially for women with migraine with aura (associated with estrogen dose)

Earlier menopause- increased risk especially < 40yo (HRT not recommended beyond 10 years post menopause)
TIA

- transient neurological deficits related to hypoperfusion in a limited area of the brain
- 10% of patients with TIA will have a stroke within 90 days (highest risk 24 hours)
- definition based on imaging findings no longer on duration (<24 hours)
- used interchangeably with minor stroke
- motor and speech symptoms- greater likelihood of brain ischemia
NONFOCAL SYMPTOMS:
- generalized weakness
- dizziness/lightheadedness
- bilateral symptoms - eg. hand tingling/numbness
ONSET: gradual, progressive
RECURRENT: repeated stereotypical symptoms
## The ABCD² Rule

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Points</th>
</tr>
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<tbody>
<tr>
<td>Age &gt; 60 years</td>
<td>1</td>
</tr>
<tr>
<td>Initial BP &gt; 140/90</td>
<td>1</td>
</tr>
<tr>
<td>Unilateral Weakness</td>
<td>2</td>
</tr>
<tr>
<td>Speech Impairment without Weakness</td>
<td>1</td>
</tr>
<tr>
<td>Symptom Duration 10-59 minutes</td>
<td>1</td>
</tr>
<tr>
<td>Symptom Duration &gt; 60 minutes</td>
<td>2</td>
</tr>
<tr>
<td>History of diabetes</td>
<td>1</td>
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</tbody>
</table>

Low risk = 0-3  | Moderate risk = 4-5  | High risk ≥ 6
What now?

- Workup and treatment the same as for stroke
QUESTIONS?

Had better days, Lois. Better days