Acute CVA and TIA

Learning Objectives
1. Assess patients with underlying risk factors for stroke.
2. State the 2009 AHA/ASA definition of TIA and describe the recommended evaluation.
3. Formulate plans to assist patients in making behavioral modifications (such as smoking, lowering high blood pressure) to decrease their risk of having a stroke.
4. Propose appropriate treatment options to improve outcomes in patients who suffer a stroke.
5. Assist patients and caregivers in identifying resources and dealing with the after effects of stroke.

In 30 Minutes ... The Plan

• CVA risk factors and prevention
• Acute CVA care
• TIA - everything has changed

1. Acute stroke events are most often the result of which of the following pathological process?

A. Acute thrombosis
B. Acute embolic event
C. Acute intracerebral hemorrhage
D. Acute subarachnoid hemorrhage

Stroke Type/Subtypes

- Ischemic (80%-85%)
  - Thrombotic
    - Large-vessel (20%-25%)
  - Embolic (30%)
    - Small-vessel (20%-25%)

- Hemorrhagic (15%-20%)
  - Intracerebral (10%)
  - Subarachnoid (6%)
Stroke Risk Factors

- Traditional vs. novel
- Modifiable vs. non-modifiable
  - Age
  - Sex
  - Family Hx
  - Ethnicity

2. Which of the following risk factors is associated with the greatest risk for developing a stroke?

A. Hypertension
B. Smoking
C. Physical inactivity
D. Elevated LDL

Traditional Risk Factors and CVA

- Accounts for 2/3 of all strokes

Stroke Type/Subtypes and Risk Factor: HTN

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Ischemic (80%-85%)</th>
<th>Hemorrhagic (15%-20%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thrombotic</td>
<td>Large-vessel (20%-25%)</td>
<td>Intracerebral (10%)</td>
</tr>
<tr>
<td>Small-vessel (20%-25%)</td>
<td>Subarachnoid (6%)</td>
<td></td>
</tr>
</tbody>
</table>

Modifiable Risk Factors: HTN (the Placebo-Controlled Trials)

<table>
<thead>
<tr>
<th>Study</th>
<th>Population</th>
<th>Treatment</th>
<th>NNT/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRC, 1985</td>
<td>17,354 pts Age: 36-64 Diastolic: 90-109</td>
<td>a) Bendrofluazide or b) Propranolol vs. placebo</td>
<td>90/5.5yrs 192/5.5yrs</td>
</tr>
<tr>
<td>SHEP, 1991</td>
<td>4,736 pts Age: 60+ BP: 160-219/90+</td>
<td>Chlorthalidone vs placebo</td>
<td>43/4.5yrs</td>
</tr>
<tr>
<td>STOP, 1991</td>
<td>1,627 pts Age: 70-84 BP: 180-239/90+</td>
<td>a) B-Blocker, or b) HCTZ + amiloride, or c) ACE-I vs. placebo</td>
<td>34/4.0yrs</td>
</tr>
<tr>
<td>MRC-2, 1992</td>
<td>4,396 pts Age: 65-74 BP: 160-209/&lt;115</td>
<td>a) HCTZ + amiloride, or b) atenolol vs placebo</td>
<td>53/5.8yrs 103/5.8yrs</td>
</tr>
</tbody>
</table>

If you can control BP, can you reduce CVAs?
Which Antihypertensive (for 1st Prevention)?

• **STOP-2, 1999** 6,614 pts, Age: 70-84, BP > 180/105
  HCTZ + amiloride = B-Blockers = ACE-I = Ca++ blocker
• **ALLHAT, 2002** 33,357 pts, Age: >55, (+)CHD risk
  Chlorthalidone = amlodipine > lisinopril doxazosin
  manufacturer supported
• **LIFE, 2002** 9,193 pts, Age: 55-80, BP: 160-200/95-11
  + LVH!!!!
  4-yr stroke rate: losartan (5%) vs. atenolol (7%)

Stroke Type/Subtypes and Risk Factor: **DM**

- Ischemic (80%-85%)
  - Large-vessel (20%-25%)
  - Thrombotic (20%-25%)
  - Embolic (30%)
- Small-vessel (20%-25%)
- Hemorrhagic (15%-20%)
  - Intracerebral (10%)
  - Subarachnoid (6%)

Which risk factor for which type of stroke?

Atrial Fibrillation and Stroke

- The older the patient with atrial fibrillation, the higher the risk of cardioembolic stroke.
- Strokes due to Afib have higher mortality and morbidity.
- Warfarin decreases absolute annual risk from 4.5% → 1.4% (NNT=30).


<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Recommended Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No risk factors</td>
<td>ASA 81-325mg q d</td>
</tr>
<tr>
<td>One moderate risk factor</td>
<td>ASA or warfarin</td>
</tr>
<tr>
<td>Any high-risk OR ≥ 2 moderate risk factors</td>
<td>Warfarin (INR 2.0-3.0)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHADS2 Risk Criteria</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Stroke or TIA</td>
<td>2</td>
</tr>
<tr>
<td>Age &gt;75 yrs</td>
<td>1</td>
</tr>
<tr>
<td>HTN</td>
<td>1</td>
</tr>
<tr>
<td>DM</td>
<td>1</td>
</tr>
<tr>
<td>CHF</td>
<td>1</td>
</tr>
</tbody>
</table>

Atrial Fibrillation: Who Gets Warfarin? Would the CHADS2 Score Help?

- Risk Category
  0: Low-risk (ASA)
  1: Moderate (ASA or warfarin)
  2+: High-risk (warfarin)

<table>
<thead>
<tr>
<th>CHADS2 Score</th>
<th>CVA Rate (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.9 (1.2 - 3.0)</td>
</tr>
<tr>
<td>1</td>
<td>2.8 (2.0 - 3.8)</td>
</tr>
<tr>
<td>2</td>
<td>4.0 (1.5 - 7.6)</td>
</tr>
<tr>
<td>3</td>
<td>5.9 (4.5 - 7.3)</td>
</tr>
<tr>
<td>4</td>
<td>8.5 (6.3 - 11.3)</td>
</tr>
<tr>
<td>≥ 5</td>
<td>12.5 (8.2 - 17.5)</td>
</tr>
</tbody>
</table>

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Atrial Fibrillation: Warfarin Risks/Benefits

- Decreases CVA by 64% (vs. ASA 22%)
  - Absolute reduction approx. 3%/yr
- Rate of ICH 0.1 - 0.6%
  - Increased with advanced age, HTN
- Major bleeding rates: 1.2%/yr

What About Clopidogrel + ASA vs Warfarin? Don’t Go There!!!

- Methods: 6,706 pts with Afib
  - Randomized double blind to:
- Results:
  - ASA + Clopidogrel vs Warfarin
    - Rate of CVA (%/yr) 2.39% vs 1.4%
    - CVA/embolus/MI, vascular death: 5.6% vs 3.9%
    - Hemorrhage: 15.4% vs 13.2%
    - Total mortality: No difference

Trial stopped early because of superiority of warfarin!

What about Dabigatran (Pradaxa)?

- Methods: 18,113 pts with afib, randomized to:
  - dabigatran 110mg BID
  - dabigatran 150mg BID
  - warfarin
- Results
  - CVA/embolism: 1.53% vs 1.11% vs 1.69%
  - Major bleeding/yr: 2.71% vs 3.11% vs 3.96%
  - Mortality rate/yr: 3.75% vs 3.64% vs 4.13%

NNT=172
Cost: Pradexa = $230 per month, $2760 per year

Traditional Risk Factors and CVA

Physical Activity: Just Do It!

- Methods: Women’s Health Study
  - 39,315 women, reported physical activity at baseline, followed 11.9 yrs
- Results: compared to sedentary (nonwalkers)
  - Walk > 2 hrs/week ==> lowered CVA risk 30%
  - ... and speed (ie, vigorous) did not matter!!


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Do Lower Lipids Decrease CVA Risk?

- Studies that say “yes” have all been done on patients with CV disease or have multiple risk factors, and
- “Stroke” was always a secondary end point in these trials.

The Last “Traditional” Risk Factor: What About Family History?

- Documented parental stroke by 65 yrs of age is associated with a 3-fold increase in stroke in offspring.

Based on 8-year follow-up of 3,443 stroke-free Framingham offspring

Seshadri S, et al. Stroke. 2010

Stroke Risk Factors

- Traditional vs. novel
- Modifiable vs. non-modifiable
  - Age
  - Sex
  - Family Hx
  - Ethnicity

Novel CVA Risk Factors: Antidepressants

- Methods: 136,293 post-menopausal women
  - From WHI, prospectively followed, avg 5.9 yrs
  - 5,496 were taking antidepressant at start
- Results:
  - SSRI 1.40 (1.09-1.80)
  - Hemorrhagic stroke 2.12 (1.1 - 4.07)
  - Ischemic stroke 1.21 (0.8 - 1.83)
  - All cause mortality 1.32 (1.1 - 1.59)
  - TCA All cause mortality 1.67 (1.33-2.09)


Stroke Type/Subtypes and Risk Factor: Intracerebral Bleed

- Ischemic (80%-85%)
  - Thrombotic (20%-25%)
  - Embolic (30%)
  - Small-vessel (20%-25%)

- Hemorrhagic (15%-20%)
  - Intracerebral (10%)
  - Subarachnoid (8%)

Risk Factors: Intracerebral Hemorrhage

- Hypertension
- Amyloid angiopathy
- AVMs
- Brain tumors
- Bleeding disorders
- Vasculitis
- CNS infection
- Septic embolism

- High-risk groups
  - Older age
  - Ethnicity
    - (African American, Asian, Mexican American)
  - Drugs
    - Anticoagulants
    - Cocaine
    - Amphetamines
    - SSRIs
Subarachnoid Hemorrhage

- 80% due to saccular aneurysms
- Who is at risk?
  - Hypertension
  - Smoking
  - Vasculitis, SLE
  - Genetic
- Peak age 50

In 30 Minutes … The Plan

- CVA risk factors and prevention
- Acute CVA care
- TIA - everything has changed

What Is the Data Supporting tPA for Stroke?

<table>
<thead>
<tr>
<th>Trial</th>
<th># of pts</th>
<th>Time to drug</th>
<th>Drug and dose</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECASS</td>
<td>620 pts</td>
<td>6 hours</td>
<td>TPA: 1.1mg/kg</td>
<td>Increased mortality</td>
</tr>
<tr>
<td>NINDS</td>
<td>624 pts</td>
<td>3 hours</td>
<td>TPA: 0.9mg/kg</td>
<td>Neurologic improvement at 3 months</td>
</tr>
<tr>
<td>ECASSII</td>
<td>800 pts</td>
<td>6 hours</td>
<td>TPA: 0.9mg/kg</td>
<td>No neurologic change increased ICH &amp; mortality</td>
</tr>
<tr>
<td>ATLANTIS</td>
<td>547 pts</td>
<td>3-5 hours</td>
<td>TPA: 0.9mg/kg</td>
<td>No neurologic change increased ICH &amp; mortality</td>
</tr>
</tbody>
</table>

The NINDS Trial

<table>
<thead>
<tr>
<th>Location</th>
<th># of Pts</th>
<th>Time of CVA</th>
<th>Drug and Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>624</td>
<td>3 hours</td>
<td>1) TPA: 0.9 mg/kg vs 2) Placebo</td>
</tr>
</tbody>
</table>

RESULTS

A. Mortality: No difference!!!
B. Part 1: At 24-hour neurologic assessment (291 pts) No difference!!!
C. Part 2: 3-month neurologic assessment (333 pts) (* Significant difference***)

Positive Results

- 50% of pts with minimal/no disability at 3 months (with tPA) vs 38% of pts with minimal/no disability at 3 months (with placebo)
- Number needed to treat (to experience benefit): 1 in 8

Absolute risk reduction (ARR) = 12% (NNT=8)

Number needed to treat (NNT) = 1/ARR
Example: 1/.12 = 8.3

3. An 82 y/o male developed sudden dysarthria and right upper extremity weakness at 8am. He arrives at the ED at 11a. At 12 noon, the labs and head CT are reported as “normal”. Which of the following is true?

- A. Is not a candidate for thrombolytic therapy (tPA) because therapy is not started within 3 hours of onset of symptoms.
- B. Is a candidate for thrombolytic therapy (tPA) because treatment can be initiated within 4.5 hours of onset of symptoms.
- C. Is not a candidate for thrombolytic therapy (tPA) because the “normal” CT scan suggests the patient does not have a stroke.
- D. Is not a candidate for thrombolytic therapy (tPA) regardless of the timing because his age is > 80 years.
The NINDS Trial

Positive Results
• 50% of pts with minimal or no disability at 3 months (with tPA) vs
• 38% of pts with minimal or no disability at 3 months (with placebo)

Number needed to treat (to experience benefit): 1 in 8

Negative Results
• 6.4% of pts develop intracranial hemorrhage (with tPA) vs
• 0.6% of pts develop intracranial hemorrhage (with placebo)

Number needed to harm: 1 in 16

I Heard That tPA Can Now Be Given Up to 4.5 Hrs After Onset of Stroke?

ECASS 3, NEJM, 9/25/08: tPA 3 - 4.5 hours
Results:
<table>
<thead>
<tr>
<th></th>
<th>(+) tPA (n=418)</th>
<th>Placebo (n=403)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mRankin score (0-1)</td>
<td>52.4%</td>
<td>45.2%</td>
</tr>
<tr>
<td>Symptomatic ICH</td>
<td>2.4%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Absolute difference = 7%, NNT = 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute difference = 2.2%, NNH = 45</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** But only patients < 80 years of age are eligible!!!

3. An 82 y/o male developed sudden dysarthria and right upper extremity weakness at 8am. He arrives at the ED at 11a. At 12 noon, the labs and head CT are reported as “normal”. Which of the following is true?

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C. Is not a candidate for thrombolytic therapy (tPA) because the “normal” CT scan suggests the patient does not have a stroke.
D. Is not a candidate for thrombolytic therapy (tPA) regardless of the timing because his age is > 80 years.

What About Heparin (UFH) and Low-Molecular Weight Heparin (LMWH)?

Just say “NO.”

• AHA/ASA 2003, 2007 recommend “against”
  – IST (Lancet, 1997): 19,435 pts, UFH => no benefit
  – LMH - initial trials promising, subsequent disappoint
  – TOAST trial (JAMA,1998) LMH => no benefit
• Cochrane Review: 24 trials (23,748 pts) =>
  – 9 fewer ischemic strokes (per 1,000) with heparin
  – 9 more intracerebral hemorrhages (per 1,000)

What About Aspirin? Say, “Yes”

  Methods: 20,000 pts with acute ischemic CVA, within 48 hrs of onset, randomized to:

<table>
<thead>
<tr>
<th></th>
<th>Aspirin 160 mg q d</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully recovered</td>
<td>38.7%</td>
<td>37.7%</td>
</tr>
<tr>
<td>Independent, not full recovered</td>
<td>33.3%</td>
<td>33.6%</td>
</tr>
<tr>
<td>Dependent</td>
<td>28.0%</td>
<td>28.7%</td>
</tr>
<tr>
<td>Mortality</td>
<td>3.6%</td>
<td>4.2%</td>
</tr>
<tr>
<td>Dead or dependent</td>
<td>30.5%</td>
<td>31.6%</td>
</tr>
</tbody>
</table>

• Cochrane Review, Issue 3, 2008
  – 9 trials (41,399 pts)
  – 13 pts: alive and independent (per 1,000) with ASA
  – 10 more pts: made complete recovery (per 1,000)
  – 2 more pts: intracerebral hemorrhage (per 1,000)

Acute Ischemic Stroke

• What about warfarin?
  – Just say, “NO!”
• What about clopidogrel (Plavix)?
  – Just say, “NO!”
• What about glycoprotein IIb/IIIa inhibitors?
  – Just say, “NO!”
• What about prophylactic antiseizure meds?
  – Just say, “NO!”

AHA/ASA Ischemic Stroke Guidelines, 2007

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Acute Ischemic Stroke

- What about antipyretics (in fever)?
  - Just say, "YES!"
- What about treating glucose (>140mg/dL)?
  - Just say, "YES!"
- Assessment of swallowing before feeding?
  - Just say, "YES!"
- What about anticoagulants to prevent VTE??
  - Just say, "YES!"
  - ... But ideal timing of starting is not clear!!!!

AHA/ASA Ischemic Stroke Guidelines, 2007

Stroke Units

- CVA accounts for 4% of all hospital admissions
- Cochrane Review: 23 trials reviewed
  - Decreases odds of death or dependency by 20% at 1 year!!!
  - Why? It’s not the high-tech stuff!!!!

1) Aspiration prevention, use of oxygen, and use of acetaminophen (for fever) were more commonly used in stroke units than general wards.
2) Less use of urinary catheters were noted in stroke units.
3) Stroke units experienced less stroke progression or recurrence, chest infections, other infections, falls, and pressure sores.
4) A review of death certificates suggests that stroke units do not prevent neurologic deaths, but deaths from stroke complications such as infections.

Stroke. 2007;38(9):2536-2540.

4) Your patient with an acute CVA ...
you start aspirin, but the blood pressure remains 195/100.

You should:

A. Start IV labetolol
B. Start IV nitroprusside (Nipride)
C. Start sublingual nifedipine
D. Continue to monitor

Blood Pressure Control: CAUTION in Acute CVA!!!

- Elevated BP is body’s desire to maintain cerebral perfusion
- AHA guidelines: treat BP systolic >220, treat BP diastolic >120
- Recommended meds:
  1) labetalol: 10 mg q 10-20 min
  2) nicardipine: 5 mg/hr, titrate q 5 min

AHA Stroke Guideline, 2007

5. TIA (Transient Ischemic Attack) is defined as:

A. Sudden focal neurologic deficit caused by focal brain ischemia of vascular origin that completely resolves in 24 hours
B. A brief episode of neurologic dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting <1 hour, and without evidence of acute infarction
C. A brief episode of neurologic dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting <1 hour, and with hyperacute changes on MRI
D. A transient episode of neurologic dysfunction caused by focal brain, spinal cord, or retinal ischemia, without acute infarction
5. TIA (Transient Ischemic Attack) is defined as:

- **A.** Sudden focal neurologic deficit caused by focal brain ischemia of vascular origin that completely resolves in 24 hours
- **B.** A brief episode of neurologic dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting <1 hour, and without evidence of acute infarction
- **C.** A brief episode of neurologic dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting <1 hour, and with hyperacute changes on MRI
- **D.** A transient episode of neurologic dysfunction caused by focal brain, spinal cord, or retinal ischemia, without acute infarction

6. **TIA: The Definition Has Changed!!!!**

- **Classic definition:** sudden focal neurologic deficit caused by focal brain ischemia of vascular origin that completely resolves in 24 hours
- **2002 TIA Working Group**
  “A brief episode of neurologic dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting less than 1 hour, and without evidence of acute infarction”

**TIA: New Definition**

**AHA/ASA Statement: June 2009**

“A transient episode of neurologic dysfunction caused by focal brain, spinal cord, or retinal ischemia, without acute infarction”

**Note 1:** No time limitation

**Note 2:** A tissue-based definition (no evidence of acute infarction)

**Why No Time Limits?**

<table>
<thead>
<tr>
<th>Duration of symptoms, hrs</th>
<th>DWI hypersensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1</td>
<td>33.6%</td>
</tr>
<tr>
<td>1 - 2</td>
<td>29.5%</td>
</tr>
<tr>
<td>2 - 3</td>
<td>39.5%</td>
</tr>
<tr>
<td>3 - 6</td>
<td>30.0%</td>
</tr>
<tr>
<td>6 - 12</td>
<td>51.1%</td>
</tr>
<tr>
<td>12 - 18</td>
<td>50.0%</td>
</tr>
<tr>
<td>18 - 24</td>
<td>49.5%</td>
</tr>
</tbody>
</table>


**What Does DWI-MRI Tell Us?**

The longer duration of symptoms, the greater the likelihood of (+) DWI-MRI (ischemia)

**Acute Coronary Syndrome (ACS)**
- non-diagnostic EKG
  - **Troponin**
- Unstable Angina
  - (-) troponin
  - Myocardial Infarction
  - (+) troponin

**Transient neurologic changes and has returned to baseline**
Acute Coronary Syndrome (ACS)

- Non-diagnostic EKG
- Troponin
- Transient neurologic changes and has returned to baseline

Unstable Angina

- (-) troponin

Myocardial Infarction

- (+) troponin

TIA

- MRI

CVA

- MRI

"Acute neurovascular syndrome"

"Acute neurovascular syndrome"

So My Patient Has a Neg (-) MRI
Was It a TIA?

TIA: Anterior Circulation
- Hemiparesis
- Unilateral sensory loss
- Visual field deficit
- Gaze preference
- Aphasia
- Left-sided spatial neglect

"negative" or "lost"

TIA: Posterior Circulation (Several usually present)
- Loss of consciousness**
- Dizziness
- Generalized weakness
- Mental confusion
- Vision: wavy lines, flashing lights (retina)
- Limb shaking or "tingling"
- Incontinence

Not Associated With TIA:
- "Crossed deficits"
- Diplopia
- Disconjugate gaze
- Gaze palsy
- Nystagmus
- Dysarthria with dysphagia
- Vertigo
- Intractable vomiting
- Limb/gait ataxia

Does This Patient Have a TIA?

TIA: Posterior Circulation (Several usually present)
- Hemiparesis
- "Crossed deficits"
- Diplopia
- Disconjugate gaze
- Gaze palsy
- Nystagmus
- Dysarthria with dysphagia
- Vertigo
- Intractable vomiting
- Limb/gait ataxia

Unlikely to be TIA (If symptoms are isolated)
- Sensory symptoms confined to part of 1 limb
- Loss of balance
- Diplopia
- Scintillating scotomas
- Amnesia
- Drop attack
- Dysphagia
- Vertigo
- Tinnitus

** Loss of consciousness associated with other symptoms such as "negative" or "lost"
The Differential Diagnosis of TIA

- Structural brain lesion (tumor, hemorrhage, AVM, aneurysm)
- Infection (focal abscess, septic emboli)
- Seizure/Todd’s paralysis
- Complicated migraine
- Hypoglycemia
- Syncope from any cause (especially arrhythmia)
- Labyrinthine disorders
- Temporal arteritis
- Multiple sclerosis (flare)

6. Mr. X is a 72-year-old male with a history of Type 2 DM, HTN; presents to the ED complaining that he had uncontrollable slurring of words for 15 minutes. This resolved 45 minutes ago, and currently he has no complaints. BP: 160/92

It is 1 am; labs and EKG are normal. CT is also normal.

The AHA/ASA recommend which scoring system to calculate this patient’s short-term risk of developing a CVA?

A. ABCD score
B. ABCD² score
C. The California scoring system
D. The Oxfordshire scoring system

ABCD² Score

- Age: greater than or equal to 60 (1 pt)
- Blood pressure: SBP >140 or DBP >90 (1 pt)
- Clinical Features:
  - Focal weakness (2 pt) or
  - Speech impairment without focal weakness (1 pt)
- Duration of symptoms:
  - ≥60 minutes (2 pt) or
  - ≤59 minutes (1 pt)
- Diabetes (1 pt)

Risk of CVA at 2 days

- 0-3 points = 1% risk
- 4-5 points = 4.1% risk
- 6-7 points = 8.1% risk

What Do You Do With the ABCD² Score?

In 2009, the AHA/ASA Recommended:

“It is reasonable to hospitalize patients with TIA if they present within 72 hours of the event and any of the following criteria are present:

a. ABCD² score of ≥3
b. ABCD² score of 0-2 and uncertainty that diagnostic workup can be completed within 2 days as an outpatient
c. ABCD² score of 0-2 and other evidence that indicates the patient’s event was caused by focal ischemia”

All Class IIA “reasonable,” Level of evidence C

What Do You Do With the ABCD² Score?

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b. ABCD² score of 0-2 and uncertainty that diagnostic workup can be completed within 2 days as an outpatient
c. ABCD² score of 0-2 and other evidence that indicates the patient’s event was caused by focal ischemia”

All Class IIA “reasonable,” Level of evidence C
7. The Case Continues…

The next day, Mr. X’s MRI is normal. Your first choice to assess this patient for possible extracranial disease is:

A. Obtain a Transcranial Doppler
B. Obtain a carotid ultrasound
C. Because of their higher sensitivity, MRA or CTA are now the recommended screening tests in patients with TIA
D. Because of the risk of contrast-induced nephropathy, MRA is recommended over CTA

8. Mr. X’s evaluation reveals: An 80% stenosis in the left carotid artery and 50% stenosis in the right carotid artery.

Which of the following statements is true?

A. The patient should be considered for a left carotid endarterectomy.
B. The patient should have a left carotid endarterectomy, followed 2-3 months later by a R carotid endarterectomy.
C. Because the patient’s symptoms are due to thromboembolic disease, the patient is not a candidate for endarterectomy.
D. Best outcomes are seen if carotid endarterectomy is performed at least 2 weeks after TIA has occurred.

AHA/ASA 2011 Guideline on Carotid and Vertebral Disease, Released 1/31/11

• “Duplex US is recommended to detect carotid stenosis in pts. who develop focal neurological symptoms corresponding to the territory supplied by the L or R internal carotid artery”
• “…MRA or CTA is indicated to detect carotid stenosis when US either cannot be obtained or yields equivocal or …nondiagnostic results”

Class I recommendation, Level of evidence C

Carotid Endarterectomy

- Indicated in symptomatic patients with 70%-99% stenosis
- Consider in symptomatic patients with 50%-70% stenosis
  - 3 trials (NASCET, ECST, VA) benefits of CEA best in:
    - Men > women
    - Age > 75
    - Recent minor stroke (vs TIA)
    - Presence of hemispheric symptoms (not amaurosis fugax)
    - Early surgery (within 2 weeks of TIA)
- Note: These studies done prior to era of widespread aggressive medical therapy

AHA, American Stroke Association, 2006

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9. In 2007, the USPSTF stated:

A. All adults >65 years of age should have ultrasound screening for carotid artery disease.
B. Adults >65 years of age with diabetes should have ultrasound screening for carotid artery disease.
C. Adults >65 years of age with any of the common risk factors for atherosclerosis (DM, HTN, smoking, family history, or hypercholesterolemia) should have ultrasound screening for carotid artery disease.
D. Adults should not be screened for carotid artery disease with ultrasound or other tests.

Carotid Artery Screening … (Asymptomatic Population)

- **The bottom line:** Prevalence of disease in age >65 = 1%
- 4,348 persons would need screening to prevent 1 CVA in 5 years.
- 8,696 persons would need screening to prevent 1 disabling CVA in 5 years.

Answers

1. A
2. A
3. A
4. D
5. D
6. B
7. B
8. A
9. D