



The POINT Trial Training Module

TIA Mimics and the ABCD² Score

Introduction

TIA Mimics

ABCD² Score

Morisky Medication Adherence Scale

Some slides modified from presentations by SC Johnston and SB Coutts



The Definition of Stroke/ TIA

A clinical syndrome characterized by the sudden onset of a focal neurological deficit presumed to be on a vascular basis



Focal Neurologic Symptoms

- **Motor: weakness, clumsiness, ataxia*** – one side of body
- **Speech/language: difficulty speaking or expressing, slurred speech***
- **Sensory symptoms: abnormal feeling**
- **Visual: monocular, binocular, diplopia***
- **Vestibular: vertigo***

***in isolation not usually stroke**



Non-focal Neurological Symptoms

- **Generalized weakness and/or sensory disturbance**
- **Light-headedness/ faintness or blackouts**
- **Confusion**
- **Incontinence of urine or feces**
- **Tinnitus**

These are rarely due to focal ischemia



Conditions Misdiagnosed as TIA

- **Migraine accompaniment**
- **Syncope, postural hypotension**
- **Seizure**
- **Vertigo**
- **Transient Global Amnesia**
- **Anxiety/Hyperventilation**
- **Confusion**
- **Unexplained fall**
- **Peripheral nerve palsy**



Migraine

- **Migraine accompaniments: positive symptoms of focal cerebral dysfunction that develop gradually over 5-20 minutes**
- **Visual disturbances are most common**
- **Paresthesias & “heaviness” also occur**
- **Spread or march of tingling from hand to arm, to face over several minutes**
- **Commonly with headache in young people; commonly without in late life**



Syncope/Presyncope

- **Loss of consciousness is almost never TIA or stroke**
- **Non focal**
- **During event – pale, sweaty**
- **The history is key – lightheaded, what were they doing?**
Dimming of vision
- **Precipitants?**
- **Exclude cardiac causes**



Seizures

- **Partial seizures can mimic a TIA**
- **Positive symptoms: e.g., tingling, jerking**
- **Spread over a minute or so**
- **Recurrent, stereotyped episodes**
- **May have amnesia for the event**



Seizures (2)

- **Rarely: negative symptoms**
- **Todd's paresis, or postictal paresis, is focal weakness in a part of the body after a seizure. It typically is localized to one side of the body and usually subsides within 24 hours. Todd's paresis also may affect speech, eye position (gaze) or vision**
- **Transient speech arrest. Cessation of speech, aimless staring, amnesia for the event**



Vertigo

- **Labyrinthitis: acute vertigo with nausea, vomiting, ataxia, nystagmus**
- **Meniere's disease: repeated crises of severe rotatory vertigo. Can be acute. Tinnitus, deafness, pressure in the ear**
- **Benign Paroxysmal Positional Vertigo (BPPV): vertigo with nystagmus occurring after changing head position. Less than 1 minute. Diagnosed by history and examination**



Transient Global Amnesia

- **Sudden disorder of antegrade memory with some degree of retrograde amnesia**
- **Often reported as confusion**
- **Repetitively asks same questions**
- **No increased risk of stroke**



Metabolic/Toxic Disorders

- **Hypoglycemia can cause transient focal symptoms. Usually on hypoglycemic agents**
- **Stereotyped in an individual**
- **Can occur without adrenergic symptoms**
- **Check glucose in any suspected Stroke/TIA**

Metabolic/Toxic Disorders (2)



- **Hyperglycemia, hyponatremia and hypercalcemia**
 - usually encephalopathy with altered consciousness (e.g., inattention, confusion)
 - focal symptoms rare



Multiple Sclerosis

- **May have abrupt or fleeting visual, sensory or motors symptoms**
- **Usually subacute onset**
- **Young – 3rd or 4th decade versus 7th or 8th decade for stroke**
- **Abnormal examination**



Mononeuropathy and Radiculopathy

- **E.g., carpal tunnel syndrome, ulnar neuropathy**
- **Sensory loss in a dermatomal or nerve distribution, often with pain**
- **Cortical sensation intact if testable: 2 point discrimination, joint position sense**



Motor Neuron Disease (ALS)

- **Fluctuating dysarthria or limb weakness**
- **Upper and lower motor neuron abnormalities and fasciculations**



Psychological Disorders

- **Anxiety/ hyperventilation– bilateral limb and perioral sensory symptoms**
- **Conversion disorder- inconsistent exam, incompatible with normal anatomy and not explained by conventional medical disease**



The POINT trial, TIA Mimics and the ABCD² Score Training Module

Introduction

TIA Mimics

ABCD² Score

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Short-term Prognosis After TIA

Northern California Kaiser

N= 1707

Outcomes at 90 days

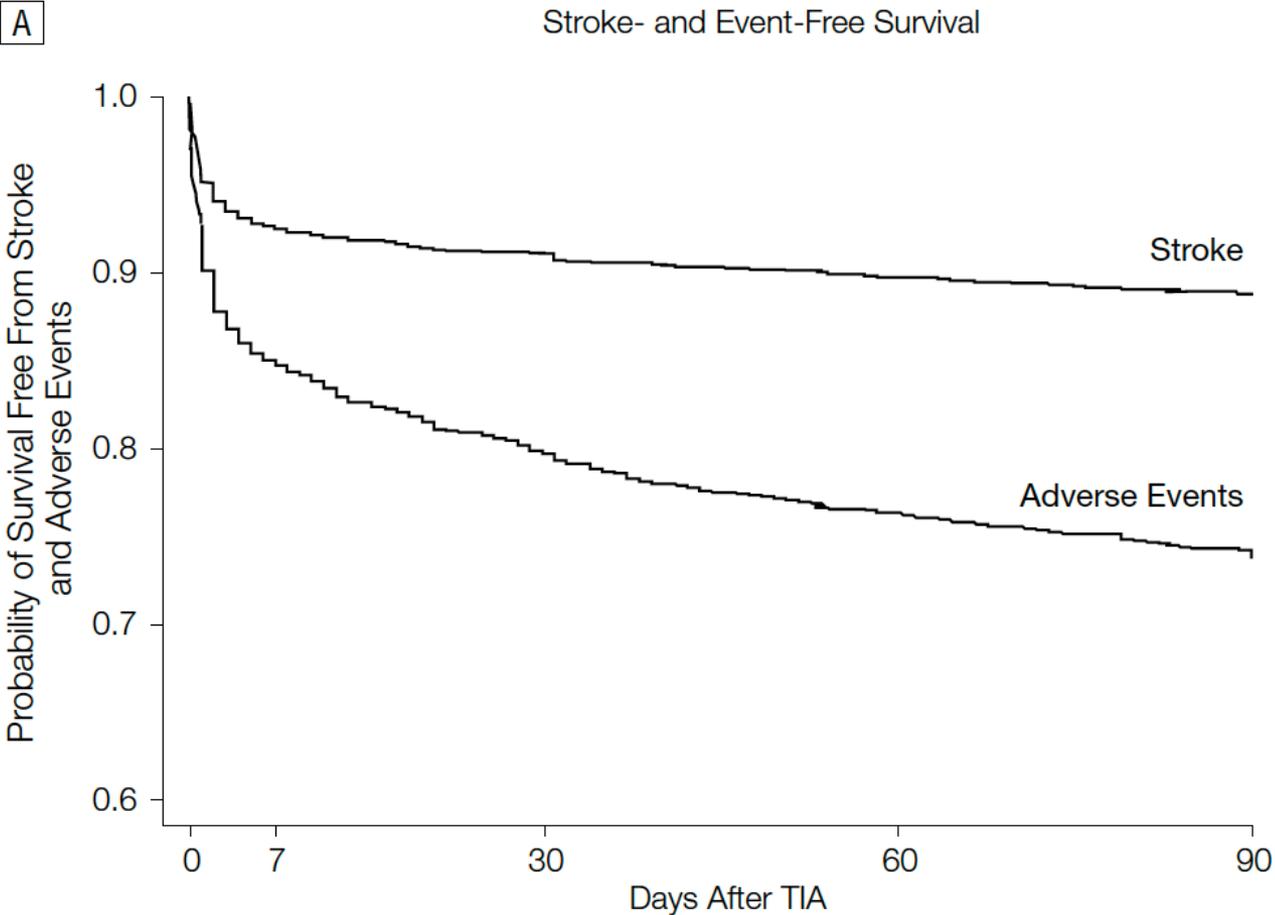
- 10.5% stroke (1/2 <2 days)
- 14.6% other adverse outcomes
 - 2.6% death
 - 2.6% hospitalization
 - 12.7% recurrent TIAs

Johnston SC, Gress DR, Browner WS, Sidney S. JAMA 2000;284(22):2901-6



Short-term Prognosis After TIA

Northern California Kaiser



Johnston et al, JAMA 284:2901



Short-term Prognosis After TIA

Northern California Kaiser

Risk Factors

- Age >60 yrs
- Diabetes
- Duration >10 min
- Any Weakness, and
- Speech impairment

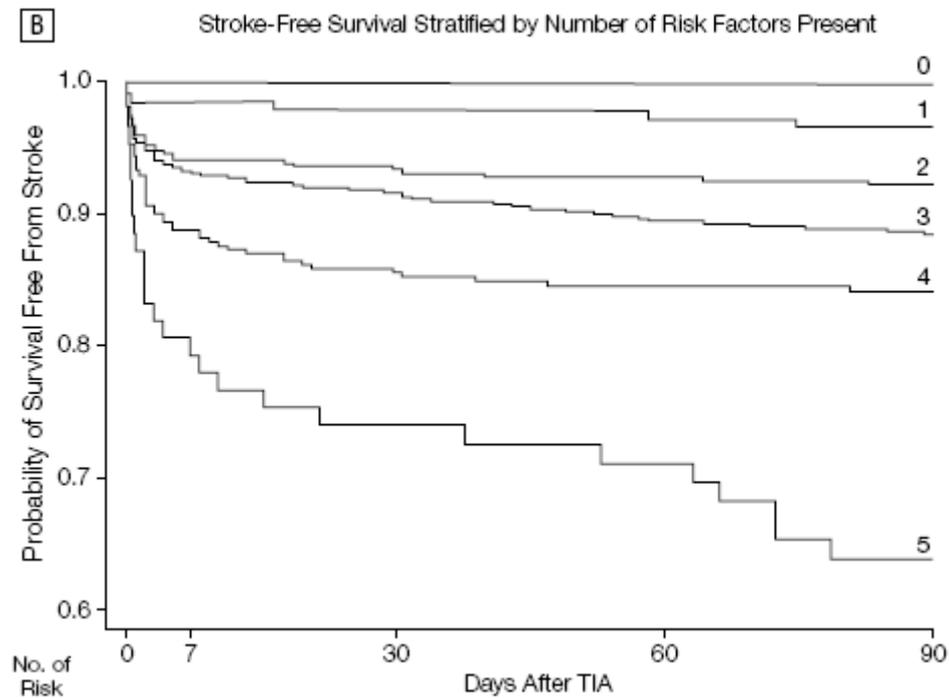
Johnston SC, Gress DR, Browner WS, Sidney S. JAMA 2000;284(22):2901-6



Short-term Prognosis After TIA

Northern California Kaiser

Stroke-Free Survival, stratified by points





90-day Stroke Risk by Number of Risk Factors

Risk Factors	No. (%)		Stroke Risk Within
<u>Number</u>	<u>Patients</u>		<u>90 Days</u>
0	22 (1%)		0 (0%)
1	179 (10%)		5 (3%)
2	509 (30%)		35 (7%)
3	584 (34%)		63 (11%)
4	337 (20%)		51 (15%)
5	76 (4%)		26 (34%)

Johnston SC, Gress DR, Browner WS, Sidney S. JAMA 2000;284(22):2901-6



Prediction Rules

California Score

- Age >60 yrs (1)
 - Diabetes (1)
 - Duration >10 min (1)
 - Any Weakness (1)
 - Speech impairment (1)
-
- Final score 0-5

Prediction Rules



ABCD Score

- Age \geq 60 yrs (1)
- Blood pressure
 - SBP $>$ 140 or DBP \geq 90 (1)
- Clinical
 - Unilateral weakness (2)
 - Speech disturbance w/o weakness (1)
- Duration
 - \geq 60 min (2)
 - 10-59 min (1)

- Final score 0-6

Rothwell et al Lancet 2005 366:29



Prediction Rules

California Score

- Age >60 yrs (1)
- Diabetes (1)
- Duration >10 min (1)
- Any Weakness (1)
- Speech impairment (1)

- Final score 0-5

Johnston et al JAMA 2000 284:2901

ABCD Score

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 - Unilateral weakness (2)
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- Duration
 - \geq 60 min (2)
 - 10-59 min (1)

- Final score 0-6

Rothwell et al Lancet 2005 366:29

ABCD² Score



Score points for each of the following:

- Age \geq 60 (1)
- Blood pressure \geq 140/90 on initial evaluation (1)
- Clinical:
 - Focal weakness (2)
 - Speech impairment without weakness (1)
- Duration
 - \geq 60 min (2)
 - 10-59 min (1)
- Diabetes (1)

Final Score 0-7

Johnston, Rothwell, et al, Lancet, 369:283, 2007



ABCD² Score and Stroke Risks

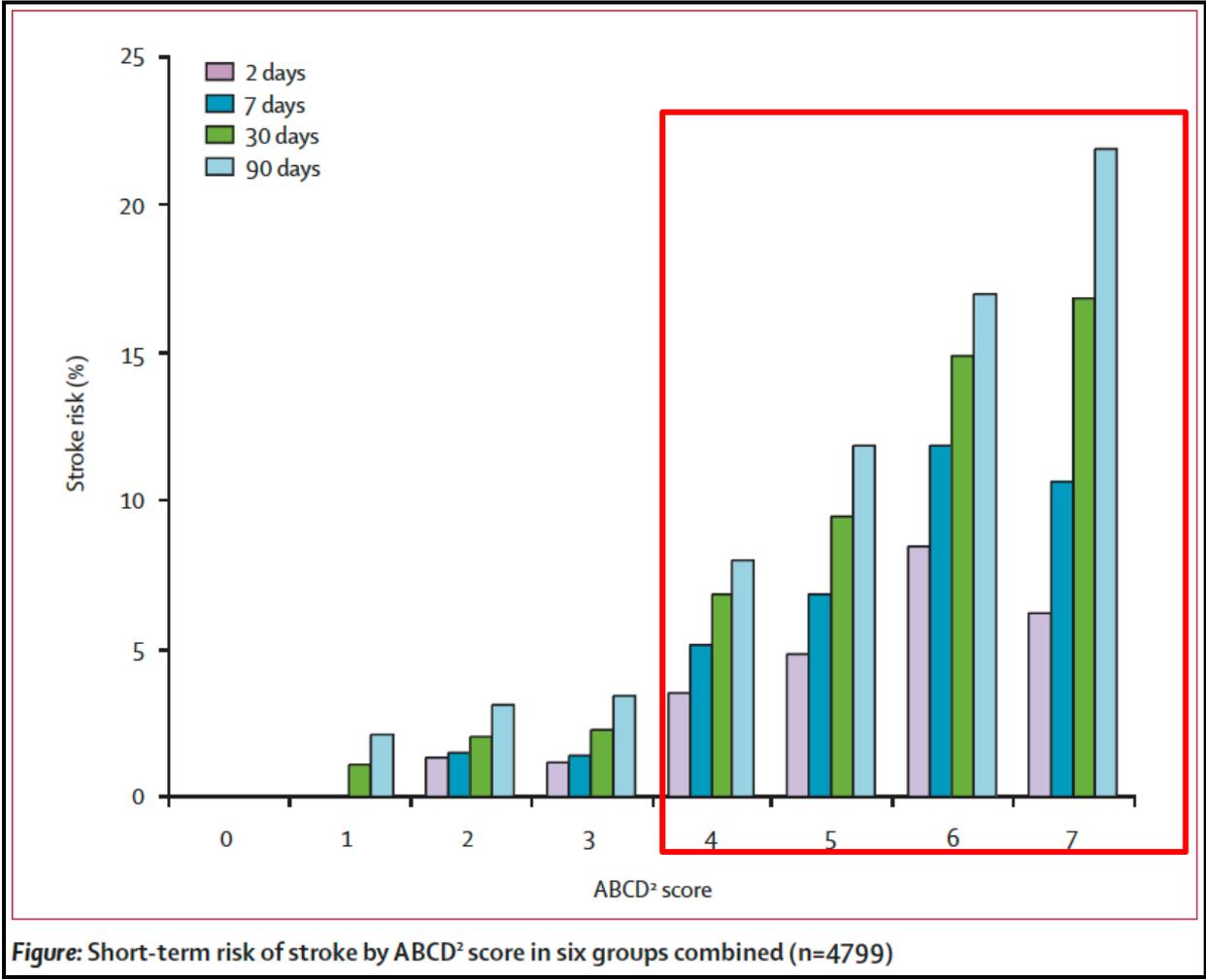


Figure: Short-term risk of stroke by ABCD² score in six groups combined (n=4799)

Johnston, Rothwell, et al, Lancet, 369:283, 2007

ABCD² Score



Definitions of the Components

Because the individual components of the ABCD² score are simple, the definition of the individual components is similarly simple

- Age \geq 60
- Blood pressure \geq 140/90 on initial evaluation
- Clinical:
 - Focal weakness
 - Speech impairment without weakness
- Duration
 - \geq 60 min
 - 10-59 min
- Diabetes

Johnston, Rothwell, et al, Lancet, 369:283, 2007

ABCD² Score

Definitions of the Components



ABCD² Components

Age

- Age 60 years or greater is self-explanatory
- Age 59 or less is scored 0 points, and
- Age ≥ 60 , score 1 point

Johnston, Rothwell, et al, Lancet, 369:283, 2007

ABCD² Score

Definitions of the Components

ABCD² Components

Blood Pressure

- Blood pressure in POINT will be a systolic pressure ≥ 140 mm Hg or a diastolic pressure ≥ 90 mm Hg, on the initial evaluation
- Systolic BP <140 and diastolic BP <90 , score 0 points
- Systolic BP ≥ 140 or diastolic BP ≥ 90 , score 1 point

Johnston, Rothwell, et al, Lancet, 369:283, 2007



ABCD² Score



Definitions of the Components

ABCD² Components

Clinical

- Focal weakness is not the simple sensation of weakness, but rather a convincing description of demonstrable weakness by the patient or an observer, or weakness present on examination . Weakness all over, or in both arms or legs is not focal weakness
- If unconvincing history or exam for focal weakness, score 0 points
- If convincing history or exam for focal weakness, score 2 points

Johnston, Rothwell, et al, Lancet, 369:283, 2007

ABCD² Score



Definitions of the Components

ABCD² Components

Clinical (2)

- Speech impairment may be either dysarthria or dysphasia, either described by the patient or accompanying observer, or present on examination
- If no speech impairment, score 0 points
- If a speech impairment is present without focal weakness, score 1 point

Johnston, Rothwell, et al, Lancet, 369:283, 2007



ABCD² Score

Definitions of the Components

ABCD² Components

Duration

- If the duration of the focal TIA symptoms or signs is:
 - <10 minutes, score 0 points
 - 10-59 minutes, score 1 point
 - ≥60 minutes, score 2 points

Johnston, Rothwell, et al, Lancet, 369:283, 2007

ABCD² Score

Definitions of the Components

ABCD² Components

Diabetes

- Diabetes in POINT is defined as diabetes diagnosed by a physician. It may be diet-controlled or require either oral medication or insulin.
- If diabetes is absent, score 0 points
- If diabetes is present, score 1 point

Johnston, Rothwell, et al, Lancet, 369:283, 2007



ABCD² Score

Practice Cases

- For ABCD² scoring
- For POINT eligibility determination



Inclusion Criteria

- Neurologic deficit (based on history or exam) attributed to focal brain ischemia and EITHER:
 - High risk TIA: Complete resolution of the deficit at the time of randomization AND ABCD² score ≥ 4
- **OR**
 - Minor ischemic stroke: residual deficit with NIHSS ≤ 3 at the time of randomization.
- Ability to randomize within 12 hours of symptom onset.
- Head CT or MRI ruling out hemorrhage or other pathology, such as vascular malformation, tumor, or abscess, that could explain symptoms or contraindicate therapy.
- Subject will be prescribed aspirin at a dose of 50-325 mg/day.

Exclusion Criteria 1

- Age <18 years.
- TIA symptoms limited to isolated numbness, isolated visual changes, or isolated dizziness/vertigo.
- In the judgment of the treating physician, a candidate for thrombolysis, endarterectomy or endovascular intervention, unless the subject declines both endarterectomy and endovascular intervention at the time of evaluation for eligibility.
- Receipt of any intravenous or intra-arterial thrombolysis within 1 week prior to index event.
- Gastrointestinal bleed or major surgery within 3 months prior to index event.
- History of non-traumatic intracranial hemorrhage.
- Known internal carotid artery stenosis >50% that could be responsible for symptoms.
- Clear indication for anticoagulation (e.g., warfarin, heparin) anticipated during the study period (atrial fibrillation, mechanical heart valve, deep venous thrombosis, pulmonary embolism, antiphospholipid antibody syndrome, hypercoagulable state).
- Qualifying ischemic event induced by angiography or surgery.
- Severe non-cardiovascular comorbidity with life expectancy <3 months.

Exclusion Criteria 2

- Contraindication to clopidogrel or aspirin:
 - Known allergy
 - Severe renal (serum creatinine >2 mg/dL or 176.8 μ mol/L) or hepatic insufficiency (prior or concurrent diagnosis, with INR>1.5, or any resultant complication, such as variceal bleeding, encephalopathy, or icterus)
 - Hemostatic disorder or systemic bleeding within the last 7 days
 - Current thrombocytopenia (platelet count <100 x10⁹/l) or neutropenia (<1 x10⁹/l)
 - History of drug-induced hematologic or hepatic abnormalities
- Anticipated requirement for long-term (>7 days) nonstudy antiplatelet drugs (e.g., dipyridamole, clopidogrel, ticlopidine), or NSAIDs affecting platelet function (such as prior vascular stent or arthritis).
- Not willing or able to discontinue prohibited concomitant medications.
- Inability to swallow medications.
- At risk for pregnancy: premenopausal or postmenopausal woman within 12 months of last menses without a negative pregnancy test or not committing to adequate birth control (e.g., oral contraceptive, two methods of barrier birth control, or abstinence).
- Unavailability for follow-up.
- Signed and dated informed consent not obtained from patient.
- Other neurological conditions that would complicate assessment of outcomes during follow-up.
- Current participation in any other study of investigational therapy, or participation in such a study within the last 7 days.
- Previously enrolled in this study.

ABCD² Score

Example Case 1- Questions

- A 64 yo diabetic woman had the sudden onset of left hemi-body numbness that lasted 15 minutes, with no other symptoms. She takes lisinopril , glyburide and atorvastatin. Her BP on arrival was 135/85 mm Hg and her neurological examination was normal.

What ABCD² score would you assign to her TIA?

Would you offer her enrollment in POINT?

ABCD² Score

Example Case 1- Answers

- A 64 yo diabetic woman had the sudden onset of left hemi-body numbness that lasted 15 minutes, with no other symptoms. She takes lisinopril , glyburide and atorvastatin. Her BP on arrival was 135/85 mm Hg and her neurological examination was normal.

What ABCD² score would you assign to her TIA?

- Age \geq 60 years: 1 point
 - Diabetes: 1 point
 - Duration \geq 10 min: 1 point
- Total Score: 3 points

Would you offer her enrollment in POINT?

- No. Score \geq 4 is required for entry, and
- No. Symptoms of TIA limited to isolated numbness, isolated visual changes, or isolated dizziness/vertigo are exclusions from POINT.

ABCD² Score

Example Case 2- Questions

- A 75 yo man with CAD had the sudden onset of left-sided weakness and slurred speech that lasted for 15 minutes, with no other symptoms. He takes atenolol, HCTZ, glyburide and aspirin. His BP on arrival was 145/85 mm Hg and his neurological examination was normal.

What ABCD² score would you assign to his TIA?

Would you offer him enrollment in POINT?

ABCD² Score

Example Case 2- Answers

- A 75 yo man with CAD had the sudden onset of left-sided weakness and slurred speech that lasted for 15 minutes, with no other symptoms. He takes atenolol, HCTZ, glyburide and aspirin. His BP on arrival was 145/85 mm Hg and his neurological examination was normal.

What ABCD² score would you assign to his TIA?

- Age \geq 60 years: 1 point
- BP \geq 140 mm Hg 1 point
- Focal weakness 2 points
- Diabetes: 1 point
- Duration \geq 10 min: 1 point
- Total Score: 6 points

Would you offer him enrollment in POINT?

- Yes. Score is \geq 4

ABCD² Score

Example Case 3- Questions

- A 59 yo woman and heavy smoker had the sudden onset of trouble speaking clearly and right-sided weakness and numbness, that lasted about 5 minutes, with no other symptoms. She takes lisinopril and atorvastatin. Her BP on arrival was 135/85 mm Hg and her neurological examination was normal.

What ABCD² score would you assign to her TIA?

Would you offer her enrollment in POINT?

ABCD² Score

Example Case 3- Answers

- A 59 yo woman and heavy smoker had the sudden onset of trouble speaking clearly and right-sided weakness and numbness, that lasted about 5 minutes, with no other symptoms. She takes lisinopril and atorvastatin. Her BP on arrival was 135/85 mm Hg and her neurological examination was normal.

What ABCD² score would you assign to her TIA?

- Focal weakness: 2 points

Total Score: 2 points

Would you offer her enrollment in POINT?

- No, a score of ≥ 4 is required for inclusion

ABCD² Score

Example Case 4- Questions

- A 65 yo man with CAD and diet-controlled diabetes had the sudden onset of a “shade” over the vision in his left eye that lasted for 10 minutes, with no other symptoms. He takes atenolol, HCTZ and aspirin. His BP on arrival was 145/85 mm Hg and his neurological examination was normal.

What ABCD² score would you assign to his TIA?

Would you offer him enrollment in POINT?

ABCD² Score

Example Case 4- Answers

- A 65 yo man with CAD and diet-controlled diabetes had the sudden onset of a “shade” over the vision in his left eye that lasted 10 to 15 minutes, with no other symptoms. He takes atenolol, HCTZ for hypertension and aspirin. His BP on arrival was 145/85 mm Hg and his neurological examination was normal.

What ABCD² score would you assign to his TIA?

- Age ≥ 60 years: 1 point
 - Diabetes 1 point
 - BP ≥ 140 mm Hg 1 point
 - Duration ≥ 10 min: 1 point
- Total Score: 4 points

Would you offer him enrollment in POINT?

- No. Again, symptoms of TIA limited to isolated numbness, isolated visual changes, or isolated dizziness/vertigo are exclusions from POINT)

ABCD² Score

Example Case 5- Questions

- A 68 yo woman had the sudden onset of hemi-body numbness, vertigo, double vision and a sense of heaviness in her legs. It lasted 15 minutes while walking in the mall. She takes only lisinopril. She says her doctor told her her blood sugars are too high but that staying away from sweets is all she needs to do. Her BP on arrival was 135/85 mm Hg and her neurological examination was normal.

What ABCD² score would you assign to her TIA?

Would you offer her enrollment in POINT?

ABCD² Score

Example Case 5- Answers

- A 68 yo diabetic woman had the sudden onset of hemi-body numbness, vertigo, double vision and a sense of heaviness in her legs. It lasted 15 minutes while walking in the mall. She takes lisinopril and glyburide. Her BP on arrival was 135/85 mm Hg and her neurological examination was normal.

What ABCD² score would you assign to her TIA?

- Age \geq 60 years: 1 point
 - Diabetes: 1 point
 - Duration \geq 10 min: 1 point
- Total Score: 3 points

Would you offer her enrollment in POINT?

- No. A score \geq 4 is required for entry

ABCD² Score

Example Case 6- Questions

- A 65 year old man with diabetes and CAD had a cardiac stent placed 1 month prior to presentation with the sudden onset of left-sided weakness 1 hour previously. Symptoms resolved after 30 minutes and his neurological examination was normal on presentation. BP on arrival was 150/85.

What ABCD² score would you assign to his TIA?

Would you offer him enrollment in POINT?

ABCD² Score

Example Case 6- Answers

- A 65 year old man with diabetes and CAD had a cardiac stent placed 1 month prior to presentation with the sudden onset of left-sided weakness 1 hour previously. Symptoms resolved after 30 minutes and his neurological examination was normal on presentation. BP on arrival was 150/85.

What ABCD² score would you assign to his TIA?

- Age \geq 60 years: 1 point
- BP \geq 140 mm Hg: 1 point
- Focal weakness: 2 points
- Diabetes: 1 point
- Duration \geq 10 min: 1 point
- Total Score: 6 points

Would you offer him enrollment in POINT?

- No, he likely needs clopidogrel for his recent cardiac stent. Remember, the anticipated requirement for long-term (>7 day) non-study antiplatelet drugs (e.g., dipyridamole, clopidogrel, or ticlopidine), or NSAIDs affecting platelet function, is an exclusion criterion for POINT.

Morisky Medication Adherence Scale



Simple four item self-reported questionnaire with closed-ended yes/no questions; assesses adherence to study medication regimen in non-threatening manner.

Morisky Scale – 0 to 4 points

1. Do you ever forget to take your study drug/aspirin?
2. Are you careless at times about taking your study drug/aspirin?
3. When you feel better, do you sometimes stop taking your study drug/aspirin?
4. Sometimes if you feel worse when you take the study drug/aspirin, do you stop taking it?

Morisky Medication Adherence Scale

Allows study personnel to prospectively identify and address potential issues of nonadherence with study drug regimen.

When specific problems identified, appropriate education and intervention can be implemented:

- Correct misbeliefs such as discontinuing medication when feeling better; link medication taking to subject's daily schedule; involve other family members for support and reinforcement.
- Provide subject with all necessary information on study drug at time of dispensing, including name of medication; purpose; duration of treatment; dosing schedule and expected adverse events.
- Give subject clear instructions about what to do in case of adverse events.
- Supply subject with simple log for recording daily doses of study medications.

The POINT trial, TIA Mimics and the ABCD² Score Training Module



This completes the POINT training module on TIA Mimics and the ABCD² Score

Click [here](#) to log-in and take the ABCD² Score test

Click [here](#) to log-in and take the POINT Enrollment test