Transient Ischemic Attack (TIA) in Adults

Intermountain Health: Canyons, Desert, and Peaks Regions

This Care Process Model was developed by the Neurosciences Clinical Program to provide general recommendations for the diagnosis, evaluation, and management of patients presenting with suspected Transient Ischemic Attack (TIA).

Key Points

- Approximately one in three individuals who experience a transient ischemic attack (TIA) will go on to have a stroke. Due to this significant risk, it is essential that patients undergo prompt evaluation and initiation of secondary prevention strategies. Timely intervention plays a critical role in reducing the likelihood of subsequent stroke and minimizing associated morbidity and mortality.
- While these guidelines provide a standardized framework for care, clinical decisions should ultimately be based on the provider's professional judgment and the individual patient's medical context. In certain cases, it may be appropriate to deviate from these recommendations to ensure the best possible outcome for the patient.

What's Inside?

Key Supporting Evidence

2021 Guideline for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack: A Guideline From the American Heart Association/ American Stroke Association

Diagnosis, Workup, Risk Reduction of Transient Ischemic Attack in the Emergency Department Setting: A Scientific Statement From the American Heart Association

Measurement:

- Discharge from ED on appropriate antithrombotic medication.
- Discharge from ED on statin if appropriate.
- Risk Stratification based on
  - Head CT or brain MRI
  - Head and Neck CTA
  - EKG
- Percentage of TIA patients returning with stroke, MI, or death within 90 days.

Caregiver Resources

- *NIH Stroke Scale (NIHSS) English/Spanish*
- *Emergency Management of Acute Ischemic Stroke (AIS) in Adults CPM*
- *Non-Traumatic Intracerebral Hemorrhage (ICH) in Adults CPM*
- *Traumatic Intracerebral Hemorrhage (ICH) in Adults (mBIG)*
- *Neuro Stroke Dashboard*
- *Intermountain Stroke Services*

Intermountain Health

Suspected TIA in the Emergency Department

Suspect Transient Ischemic Attack (TIA) in adult patient

- Acute onset
- Symptoms are referable to a neurovascular territory
- Symptoms are transient; complete return to neurologic baseline

Confirm diagnosis of TIA

- Transient neurologic symptoms that are generally NOT indicative of TIA (e.g. confusion, dizziness, headache, generalized weakness)
- Consider medical mimics of TIA **(A)**
- Perform in-depth neurological exam **(B)** to confirm return to neurological baseline

Likely TIA

Begin ED workup for TIA (C)

Begin risk stratification

- Calculate and document ABCD3-I Score **(D)**

Does patient meet ANY of the following?

- ABCD3-I score ≥4
- Atrial fibrillation (new or history of)
- Other symptomatic vascular lesion on CTA (e.g. dissection, vasospasm)
- Suspect cardioembolic etiology (e.g. endocarditis)

yes / ***no***

High Risk

Admit for expedited workup

- Neurology evaluation
- MRI brain without contrast (if not completed in ED)
- TTE (consider bubble study if <60 years old)
- Lipid panel and HgbA1c
- Cardiac telemetry monitoring

Initiate Interventions and Antithrombotics
See ***TIA Evaluation and Management pg 3*** *and* ***Pharmacotherapy Table pg 4***

Low Risk

Consider discharge home

- Facilitate PCP follow-up, ideally in <1 week AND outpatient workup* which includes:
  - MRI brain without contrast (if not completed in ED)
  - TTE (consider bubble study if <60 yrs old)
  - Lipid panel and HgbA1c
- Prescribe single antiplatelet (aspirin or clopidogrel pg 4)
- Educate patient to return to the ED for acute onset of BEFAST symptoms (see pg 5)

PCP follow-up ideally in < 1 week
See ***Outpatient Follow-up of Low-risk TIA Patients*** **on pg 4**

* Consider expedited inpatient workup if concern that outpatient workup will not be completed (e.g. lack of: resources, PCP access, social support etc.)

(A) Medical mimics of TIA
include but are not limited to

- Hypoglycemia
- Syncope
- Seizure
- Migraine
- Transient global amnesia
- Toxic/metabolic encephalopathy
- Temporal arteritis
- Functional neurologic disorder

(B) In-depth neurological exam

- Perform evaluation using the NIH Stroke Scale (NIHSS) English/Spanish with the additions below:
  - **Confusion:** more in-depth questioning
  - **Receptive aphasia:** more complex commands
  - **Eye-movement:** evaluate upward and downward gaze in addition to side-to-side
  - **Visual field:** Evaluate eyes separately
  - **Leg/Arm weakness**: Consider weakness that doesn't score points on NIHSS (e.g. distal arm/leg)
  - **Sensory loss:** TIA should not cause symmetric distal sensory loss (e.g. peripheral neuropathy)
- Do NOT include deficits explained by an existing etiology (e.g. orthopedic injury)
- Patient with chronic neurologic deficits should return to their baseline without new/worsened deficits.

(C) ED workup for TIA

Brain Imaging
- Brain MRI (preferred) or CT without contrast
- If patient admitted, CT can be performed in ED with MRI following admission to expedite ED flow
- If discharged home, preferable to complete MRI before discharge, though not necessary if logistically challenging or patient is low risk

Head and Neck Imaging
(to identify symptomatic vascular lesions)
- CTA is preferred

EKG
(to evaluate for atrial fibrillation)

Labs
- Glucose
- Troponin
- CMP
- CBC
- Tox screen

Labs to consider on individual basis
- Erythrocyte sedimentation rate (ESR), if suspect temporal arteritis
- Pregnancy test
- PT/INR, PTT
- UA, if concern for UTI

(D) ABCD3-I Scoring

	Pts
Age ≥60	1
BP ≥140/90	1
Speech impairment w/out weakness	1
Unilateral weakness	2
Duration of symptoms 10–59 min.	1
Duration of symptoms ≥60 min.	2
Diabetes	1
Dual TIA (TIA prompting medical attention AND another TIA in proceeding 7 days)	2
Ipsilateral ≥50% stenosis of int. carotid artery	2
Acute DWI hyperintensity on MRI	2

TIA Evaluation and Management

These are general guidelines. Providers should manage patients based on their clinical judgement and each patient's individual circumstances.

Investigation	Possible Findings	Management
CTA Head and Neck (should be completed in ED)	Symptomatic extracranial carotid artery stenosis >50%	• Consultation with Neurology • Dual antiplatelet therapy (DAPT) • Referral to vascular surgery for CEA
	Dissection	• Consultation with Neurology • Antithrombotic per Neurology
	Symptomatic intracranial stenosis	• Consultation with Neurology • DAPT X 90 days followed by single antiplatelet (SAPT)
	Concern for other vascular etiology (e.g. vasculitis, RCVS)	• Consultation and management per Neurology
	Any atherosclerosis seen on vessel imaging	• Consultation with Neurology • Begin high-intensity statin
	Negative	• If ABCD3-I ≥4, DAPT x 21 days followed by SAPT • If ABCD3-I <4, SAPT
TTE (with bubble study if <60 years old)	Patent Foramen Ovale (PFO) discovered on bubble study	• Evaluate for DVT – If negative for DVT treat with SAPT – If positive for DVT, start anticoagulation (typically apixaban per acute VTE dosing)- see next page • Refer to Neurology for consideration of PFO closure
	Left atrial dilation	• Antiplatelet if A-fib has NOT been confirmed • 30–day cardiac event monitor to evaluate for A-fib
Cardiac Monitoring	Atrial fibrillation (A-fib)	• Start anticoagulation (apixaban typically recommended, per A-fib dosing) See next page
	Suspected atrial fibrillation because: • Patient report of palpitations • Other embolic infarct seen on brain imaging • History of cardiac disease • No other etiology to explain TIA • Left atrial dilation seen on TTE	• 30–day cardiac event monitor to evaluate for A-fib
Lipid panel	LDL >100 mg/dL	• Start high-intensity statin

Preferred Antithrombotic Pharmacotherapy after TIA

Medications		Dosing Instructions	Notes
Antiplatelets	Dual antiplatelet therapy (DAPT)	Clopidogrel 300 mg X 1, then 75 mg daily **PLUS** Aspirin 81 mg daily Duration: Generally 21 days followed by SAPT indefinitely. If intracranial atherosclerosis, increase length of DAPT to 90 days.	Preferred for high-risk patients. For most patients with TIA, treat with antiplatelets unless there is an indication for anticoagulation.
	Single antiplatelet therapy (SAPT)	Aspirin 81 mg daily **OR** Clopidogrel 300 mg X 1, then 75 mg daily Duration: Indefinitely	Preferred for low-risk patients. For most patients with TIA, treat with antiplatelets unless there is an indication for anticoagulation.
Anticoagulation	Anticoagulation for A-fib	Apixaban 5 mg BID If ≥ 2 of the following are present: Serum creatinine ≥ 1.5 mg/dL, age ≥ 80 years, weight ≤ 60 kg; then use 2.5 mg BID	Generally, if there is an indication for anticoagulation, patient should not also be on antiplatelet medication. Alternatives to apixaban for anticoagulation depend upon patient and clinical circumstances and include rivaroxaban, dabigatran, and warfarin.
	Anticoagulation for VTE (PE or DVT)	Apixaban 10 mg BID X 7 days then 5 mg BID	
Statins	High-intensity statins	• Atorvastatin 40 mg or 80 mg daily • Rosuvastatin 20 mg or 40 mg daily	LDL goal < 70 mg/dL.
	If unable to reach LDL goal despite using maximal statin therapy, or statins not tolerated.	• Consider adding ezetimibe 10 mg daily • Consider PCSK9 inhibitor	

Suspected TIA in the Primary Care Setting

Suspect Transient Ischemic Attack (TIA) in adult patient

- Acute onset
- Symptoms are referable to a neurovascular territory
- Symptoms are transient; complete return to neurologic baseline

↓

Confirm diagnosis of TIA

- Transient neurologic symptoms that are generally NOT indicative of TIA (e.g. confusion, dizziness, headache, generalized weakness)
- Consider medical mimics of TIA **(A)**
- Perform in-depth neurological exam **(B)** to confirm return to neurological baseline (without new/worsened deficits)

↓

Likely TIA

↓

Did symptoms occur in last 24 hours?

- ***yes*** → **Send to ED for TIA workup**
- ***no*** → **Outpatient process for TIA**
  - Perform outpatient workup **(C)** as soon as possible within the ambulatory setting
  - Prescribe appropriate antithrombotic therapy per guidelines on pgs 3–4
  - Educate patient to go to the ED for acute onset of BEFAST symptoms **(D)**
  - Consider Neurology e-consults where available

(A) Medical mimics of TIA include (but are not limited to)

- Hypoglycemia
- Syncope
- Seizure
- Migraine
- Transient global amnesia
- Toxic/metabolic encephalopathy
- Temporal arteritis
- Functional neurologic disorder

(B) In-depth neurological exam

- Perform evaluation using the NIH Stroke Scale (NIHSS) English/Spanish with the additions below:
  - **Confusion:** more in-depth questioning
  - **Receptive aphasia:** more complex commands
  - **Eye-movement:** evaluate upward and downward gaze in addition to side-to-side
  - **Visual field:** Evaluate eyes separately
  - **Leg/Arm weakness**: Consider weakness that doesn't score points on NIHSS (e.g. distal arm/leg)
  - **Sensory loss:** TIA should not cause symmetric distal sensory loss (e.g. peripheral neuropathy)
- Do NOT include deficits explained by an existing etiology (e.g. orthopedic injury)

(C) Outpatient workup for TIA

Brain Imaging (to rule out other diagnoses)

- Brain MRI (preferred) or CT without contrast

Head and Neck Imaging
(to identify symptomatic vascular lesions)

- CTA is preferred

Cardiovascular Evaluations

- EKG to evaluate for atrial fibrillation
- Transthoracic Echocardiogram (TTE); consider bubble study if patient is <60 years old

Labs

- Lipid panel
- HgbA1c
- CMP
- CBC
- Tox screen

Labs to consider on individual basis

- Erythrocyte sedimentation rate (ESR), if suspect temporal arteritis
- Pregnancy test
- PT/INR, PTT

(D) BEFAST (symptoms of a stroke)

- **B**alance: Sudden loss of balance or coordination
- **E**yes: Sudden loss of vision or double vision
- **F**ace: Sudden weakness of the face
- **A**rms: Sudden weakness of an arm or leg
- **S**peech: Sudden difficulty speaking
- **T**ime: Time the symptoms started

Outpatient Follow Up After TIA

- Ensure TIA workup has been performed (pg 5 Box C)
- Ensure patient is on appropriate pharmacotherapy (See pg 3-4)

Long Term Follow Up		
Management of Vascular Risk Factors	Blood pressure	Generally <130/80, but may vary depending on comorbidities
	Obstructive Sleep Apnea	Screen/treat for OSA
	Type 2 Diabetes	Goal: HgbA1c < 7.0
Lifestyle Modifications	Cessation of	Tobacco, alcohol, other substances
	Diet	Mediterranean or low-salt
	Exercise during recovery	• Mod. intensity: 10 min, 4x/week OR vigorous intensity: 20 min, 2x/week
	Exercise when fully recovered	• Mod. intensity: 150 min/week OR vigorous intensity: 75 min/week
Referral to Neurology if:	• New finding of PFO • Recurrent symptoms • Non-ischemic, neurologic etiology suspected (e.g. seizure)	

References

1. Lee M, Cheng CY, Wu YL, Lee JD, Hsu CY, Ovbiagele B. Association between intensity of low-density lipoprotein cholesterol reduction with statin-based therapies and secondary stroke prevention: a meta-analysis of randomized clinical trials. *JAMA Neurol*. 2022;79(4):349-358. https://doi.org/10.1001/jamaneurol.2021.5578
2. Song B, Fang H, Zhao L, et al. Validation of the ABCD3-I score to predict stroke risk after transient ischemic attack. *Stroke*. 2013;44(5):1244-1248. https://doi.org/10.1161/STROKEAHA.113.000969
3. Bhatia K, Jain V, Aggarwal D, et al. Dual antiplatelet therapy versus aspirin in patients with stroke or transient ischemic attack: meta-analysis of randomized controlled trials. *Stroke.* 2021;52(3):e1-e9. https://doi.org/10.1161/STROKEAHA.120.033033
4. Dearborn-Tomazos JL, Hu X, Bravata DM, et al. Deintensification or no statin treatment is associated with higher mortality in patients with ischemic stroke or transient ischemic attack. *Stroke*. 2021;52(6):e1-e9. https://doi.org/10.1161/STROKEAHA.120.030089
5. Kleindorfer DO, Towfighi A, Chaturvedi S, et al. 2021 guideline for the prevention of stroke in patients with stroke and transient ischemic attack: a guideline from the American Heart Association/American Stroke Association. *Stroke.* 2021;52(7):e364-e467. https://doi.org/10.1161/STR.0000000000000375
6. Amin HP, Madsen TE, Bravata DM, et al. Diagnosis, workup, and risk reduction of transient ischemic attack in the emergency department setting: a scientific statement from the American Heart Association. *Stroke*. 2021;52(7):e1-e15. https://doi.org/10.1161/STR.0000000000000418
7. Shweikialrefaee B, Ko DT, Fang J, et al. Statin use and stroke rate in older adults with atrial fibrillation: a population-based cohort study. *J Am Heart Assoc.* 2023;12(3):e028381. https://doi.org/10.1161/JAHA.122.028381
8. Yao X, Abraham NS, Sangaralingham LR, et al. Effectiveness and safety of dabigatran, rivaroxaban, and apixaban versus warfarin in nonvalvular atrial fibrillation. *J Am Heart Assoc.* 2016;5(6):e003725. https://doi.org/10.1161/JAHA.116.003725

This CPM presents a model of best care based on the best available scientific evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to Intermountain's Neurosciences Clinical Program.

Intermountain Health

