CODE STROKE TEAM QUICK SHEET:

A STEPPED PROGRESSION TO IDENTIFYING A POTENTIAL CAUSE FOR CRYPTOGENIC STROKE

This resource is intended to be a clinical support tool to balance diagnostic approach, potential causes and diagnostic tests. The figures represented in this tool do not necessarily represent the views and guidelines of the AHA/ASA.

ALGORITHM FOR THE IDENTIFICATION AND DIAGNOSTIC EVALUATION OF PATIENTS WITH CRYPTOGENIC ISCHEMIC STROKE OR TRANSIENT ISCHEMIC ATTACK (TIA):

ISCHEMIC STROKE OR TIA

HISTORY PHYSICAL EXAMINATION

Standard Evaluation

STROKE TOPOGRAPHY
- *MRI of the brain*
- *CT of the brain*

VESSELS
- *MRA of the head and neck*
- *CTA of the head and neck*
- *Carotid duplex ultrasonography and transcranial Doppler ultrasonography*

CARDIAC – STRUCTURE
- *TTE*
- *TEE*

CARDIAC – RHYTHM
- *12-Lead ECG*
- *Inpatient cardiac telemetry*
- *24-Hr Holter monitor*

HEMATOLOGIC TESTING
- *Complete blood count*
- *Platelet count*
- *INR*
- *Partial-thromboplastin time*

STROKE CONSIDERED TO BE CRYPTOGENIC AFTER STANDARD EVALUATION

Advanced Evaluation

VESSELS
- *Catheter angioplasty*
- *Transcranial Doppler monitoring for emboli*
- *Vasculitis tests*

CARDIAC – RHYTHM
- *Prolonged (2-4 wk) outpatient cardiac telemetry*

HEMATOLOGIC TESTING
- *Arterial hypercoagulability tests (all patients)*
- *Venous hypercoagulability tests (if right-to-left shunt)*

STROKE CONSIDERED TO BE CRYPTOGENIC AFTER ADVANCED EVALUATION

Specialized Evaluation

GENETIC TESTING
- *Mitochondrial disease*
- *CADASIL, Fabry's disease, other genetic causes*

VESSELS
- *Detailed autoimmune evaluation*
- *CSF examination*
- *Brain biopsy*

CARDIAC – STRUCTURE
- *Cardiac CT*
- *Cardiac MRI*

CARDIAC – RHYTHM
- *Prolonged (1-3 yr) outpatient loop recording*

HEMATOLOGIC TESTING
- *Workup for occult cancer*

CONSIDERATIONS FOR CLINICAL PRACTICE:

- *For TTE, consider a bubble study using Valsalva maneuver. Rule out: PFO, etc.*
- *Monitoring choice will depend on status of patient (inpatient or outpatient), standard evaluation will likely take place in hospital.*
- *When considering monitoring, consider step wise using a shorter duration (14 days to 30 days), then move forward for longer durations as deemed clinically necessary. Consider selection of specific patients for prolonged monitoring.*
- *When considering testing for hypercoaguable states, consider this for younger patients.*

Saver, J.L. (2016). Cryptogenic Stroke. New England Journal of Medicine, 374(21), 2068.

American Heart Association | American Stroke Association
life is why

Medtronic
Supports the American Heart Association/American Stroke Association's Cryptogenic Stroke Initiative

DIAGNOSTIC EVALUATION AND THERAPEUTIC IMPLICATIONS IN ISCHEMIC STROKE:

	DIAGNOSTIC TEST	THERAPEUTIC IMPLICATIONS
CARDIAC CAUSES		
PAROXYSMAL OCCULT AF	*Noninvasive cardiac monitoring, and if no AF or flutter detected, then implantable cardiac monitoring*	*Anticoagulation therapy*
ATRIAL CARDIOPATHY	*Serum NT-proBNP, echocardiography, ECG*	*Treatment with antiplatelet vs anticoagulation is unknown, but empirical treatment with anticoagulation may be reasonable*
ATRIAL SEPTAL DEFECT	*Echocardiography (TEE superior to TTE)*	*Venous imaging if atrial septal defect detected*
ATHEROSCLEROTIC CAUSES		
AORTIC ARCH DISEASE	*Echocardiography (TEE superior to TTE)*	*Antiplatelet and statin therapy*
SUBSTENOTIC ATHEROSCLEROSIS	*Vessel wall imaging, plaque MRI*	*Antiplatelet and statin therapy*
OTHER CAUSES		
CANCER	*CT chest, abdomen, and pelvis*	*Antiplatelet vs. anticoagulation treatment of underlying cancer*
HYPERCOAGULABLE STATE	*Hypercoagulable work-up, including antiphospholipid antibodies*	*Anticoagulation therapy based on findings*
ARTERIAL DISSECTION	*MRA with fat-suppressed images*	*Antiplatelet therapy*

**AF indicates atrial fibrillation; CT, computed tomography; MRA, magnetic resonance angiography; MRI, magnetic resonance imaging; NT-proBNP, N-terminal pro-B-type natriuretic peptide; TEE, transesophageal echocardiography; and TTE, transthoracic echocardiography.*

Yaghi, S., Bernstein, R.A., Passman, R., Okin, P.M. , Furie, K.L. (2017) Cryptogenic Stroke Research and Practice. Circulation Research(120),532

CLINICAL PROFESSIONALS INVOLVED:

- **Neurologist**
  Primary physician throughout patient experience, coordinate all services, initiate diagnostic tests and personnel involved with patient care. Whenever possible, a vascular neurologist should direct the evaluation.
- **Stroke coordinators**
  Follow patient from first contact to optimize timing, maintain records, evaluate process and coordinate discharge.
- **Nurses**
  Continuous, direct, personal patient contact: accurate implementing of orders and recording of patient progress.
- **Radiologist**
  Accurate, timely imaging results coordination with neurologist, cardiologist and interventional radiologist.
- **Cardiologist**
  Necessary specialist to initiate diagnostic studies.
- **Electrophysiologist**
  Possible consultant to cardiologist if arrhythmia, specifically atrial fibrillation, is suspected cause of the event.
- **Sleep specialist**
  Recommended consultation since sleep apnea significantly elevates risk of subsequent problems.
- **Hematologist**
  Consultation if hypercoagulability is suspected.
- **Oncologist**
  Consultation if hypercoagulability is suspected due to occult (or known) malignancy.
- **Rheumatologist**
  Consultation if hypercoagulability due to occult (or known) malignancy is suspected.
- **Primary care provider (PCP)**
  A health care practitioner who will follow the patient after the cryptogenic stroke is diagnosed. The PCP should receive a hospital discharge summary to facilitate transition of care from the neurologist/cardiologist, and to follow up on tests that provide definitive diagnosis of cryptogenic stroke if needed.