Symptoms suggestive of ischemic or infarction:

- ST-elevation MI (STEMI)

**Concurrent ED assessment**

< 10 minutes

- Check Vital Signs
- IV Access
- Physical Exam
- Cardiac Marker Levels
- Check Contraindications
- Chest X-ray (<30 mins)
- 12-Lead ECG

**Immediate ED general treatment**

- Aspirin 165 - 325 mg
- Oxygen (If O2 sat < 94)
- 12-Lead ECG
- Fibrinolytic Checklist
- Pain Control

- If O2 sat < 94, Start Oxygen
- Aspirin 165 - 325 mg (If not already taken)
- Pain Control

**ECG Interpretation**

- ST-elevation MI (STEMI)
- High-risk unstable angina/non-ST-elevation MI (UA/NSTEMI)

**Low-Intermediate-risk ACS**

- Consider admission to ED chest pain unit or to appropriate bed and follow:
  - Serial cardiac markers (including troponin)
  - Repeat ECG/continuous ST-segment monitoring
  - Consider noninvasive diagnostic test.

**Reperfusion goals:**

- Door-to-ballon inflation (PCI) goals of 90 minutes.
- Door-to-needle (fibrinolysis) goal of 30 minutes.

**Troponin elevated or high-risk patient**

- Consider early invasive strategy if:
  - Refractory ischemic ST deviation
  - Ventricular tachycardia
  - Hemodynamic instability
  - Signs of heart failure

**Start adjunctive treatments as indicated**

- Nitroglycerin
- Heparin (UFH or LMWH)
- Consider: PO B-blockers
- Consider: Clopidogrel
- Consider: Glycoprotein IIb/IIIa inhibitor

**Admit to monitored bed Assess risk status Continue ASA, heparin, and other therapies as indicated**

- ACE inhibitor/ARB HMG CoA reductase inhibitor (statin therapy)
- Not at high risk: cardiology to risk stratify

**Develops 1 or more:**

- Clinical high-risk features
- Dynamic ECG changes consistent with ischemia
- Troponin elevated

**If no evidence of ischemia or infarction by testing, can discharge with follow-up.**

- Abnormal diagnostics noninvasive imaging or physiologic testing?

- Yes
- NO

- No
- YES

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Cardiac Arrest Circular Algorithm

Shout for Help/Activate Emergency Response

- Start CPR
  - Give Oxygen
  - Attach Monitor/Defibrillator

Check Rhythm

- Return of Spontaneous Circulation (ROSC)

Check Rhythm

- Post-Cardiac Arrest Care

Drug Therapy
- IV/IO access
- Epinephrine every 3-5 minutes
- Amiodarone for refractory VF/VT

Consider Advanced Airway
- Quantitative waveform capnography
- Continuous CPR

Treat Reversible Causes

- Monitor CPR Quality

CPR Quality
- Push hard (>2 inches [5 cm]) and fast (>100/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Rotate compressor every 2 minutes.
- If no advanced airway, 30:2 compression-ventilation ratio.
- Quantitative waveform capnography
  - If PETCO <10 mm Hg, attempt to improve CPR quality
  - Intra-arterial pressure
  - If relaxation phase (diastolic) pressure <20 mm Hg, attempt to improve CPR quality.

Drug Therapy
- Epinephrine IV/IO Dosage: 1 mg every 3-5 minutes
- Vasopressin IV/IO Dosage: 40 units can replace first or second dose of epinephrine
- Amiodarone IV/IO Dosage: First dose: 300 mg bolus. second dose: 150 mg

Advanced Airway
- Supraglottic advanced airway or endotracheal intubation
- Waveform capnography to confirm and monitor ET tube placement
- 8-10 breaths per minute with continuous chest compressions

Return of Spontaneous Circulation (ROSC)
- Pulse and blood pressure
- Abrupt sustained increase in PETCO (typically >40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Shock Energy
- Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available.
- Second and subsequent doses should be equivalent and higher doses may be considered.
- Biphasic: 360 J

Reversible Causes
- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo/Hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

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**Cardiac Arrest Algorithm**

**Shout for Help/Activate Emergency Response**

1. **Start CPR**
   - Give Oxygen
   - Attach Monitor/Defibrillator

2. **Rhythm shockable?**
   - YES: VF/VT, Shock
   - NO: Asystole/PEA

3. **Shock**
   - NO: CPR 2 min, IV/IO access

4. **Rhythm shockable?**
   - YES: CPR 2 min, Epinephrine every 3-5 min, Consider advanced airway, capnography
   - NO: CPR 2 min, Amiodarone, Treat reversible cause

5. **Shock**
   - NO: CPR 2 min, Epinephrine every 3-5 min, Consider advanced airway, capnography
   - YES: CPR 2 min, Treat reversible cause

6. **Rhythm shockable?**
   - YES: CPR 2 min, Epinephrine every 3-5 min, Consider advanced airway, capnography
   - NO: CPR 2 min, Amiodarone, Treat reversible cause

7. **Shock**
   - NO: CPR 2 min, Epinephrine every 3-5 min, Consider advanced airway, capnography
   - YES: CPR 2 min, Treat reversible cause

12. **Rhythm shockable?**
   - YES: CPR 2 min, Treat reversible cause
   - NO: CPR 2 min, Amiodarone, Treat reversible cause

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- **If no signs of return of spontaneous circulation (ROSC), go to 10 or 11.**
- **If ROSC, go to Post-Cardiac Arrest Care.**
Heart Rate Typically Less Than 60

SYMPTOMS?

Mild or None
- Monitor Patient for Deterioration
- Oxygen if sat < 94%

Serious Signs & Symptoms:
- Hypotension
- Altered mental Status
- Signs of Shock
- Heart Failure
- Atropine 0.5 mg
  (maybe repeated to a total of 3 mg)
  If no IV or Atropine fails:
  Transcutaneous Pacing (80/80)

> Continue to Monitor Patient for Deterioration

Dopamine infusion
2-10 mgms/kg/min
OR
Epinephrine 2-10 mgms/min
EXTREME CAUTION
IF PATIENT HAS CORONARY ARTERY DISEASE
Tachycardia With a Pulse Algorithm

Access appropriateness for clinical condition. Heart rate typically > 150/min if tachyarrhythmia.

Identify & Treat Underlying Cause
- Maintain patient airway; assist breathing as necessary
- Oxygen (if O2 sat < 94%)
- Cardiac monitor to identify rhythm; monitor blood pressure & oximetry

Persistent Tachycardia Causing:
- Hypotension?
- Acutely altered mental status?
- Signs of shock?
- Ischemic chest discomfort?
- Acute heart failure?

Synchronized Cardioversion
- Consider sedation
- If regular narrow complex, consider adenosine

Wide QRS? ≥ 0.12 second

YES

Adenosine IV Dose:
First dose: 6 mg rapid IV push; follow with NS flush.
Second dose: 12 mg if required

Antiarrhythmic Infusions for Stable wide-QRS Tachycardia
Procainamide IV Dose:
20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increase > 50% or maximum does 17 mg/kg given.
Maintenance infusion: 1-4 mg/min.
Avoid if prolonged QT or CHF.

NO

IV access and 12-Lead ECG if available.
Consider adenosine only if regular and monomorphic.
Consider antiarrhythmic infusion.
Consider expert consultation.

Doses/Details Synchronized Cardioversion
Initial recommended doses:
- Narrow regular: 50-100 J
- Narrow irregular: 120-200 J biphasic or 200 J monophasic
- Wide regular: 100 J
- Wide irregular: Defibrillation dose (NOT synchronized)

Amiodarone IV Dose:
First dose: 150 mg over 10 mins. Repeat as needed if VT recurs. Follow by maintenance infusion of 1 mg/min for first 6 hours.

Sotalol IV Dose:
100 mg (1.5 mg/kg) over 5 mins. Avoid if prolonged QT.
The Cincinnati Prehospital Stroke Scale

Facial Droop (have patient show teeth or smile)

- Normal: Both sides of face move equally.
- Abnormal: One side of face does not move as well as other side.

Arm Drift (patient closes eyes and extends both arms straight out, with palms up for 10 seconds)

- Normal: Both arms move the same or both arms do not move at all.
- Abnormal: One arm does not move or one arm drifts down compared with the other.

Abnormal Speech (have the patient say “you can’t teach an old dog new tricks”)

- Normal: Patient uses correct words with no slurring.
- Abnormal: Patient slurs words, uses the wrong words, or is unable to speak.

Interpretation: If any 1 of these signs is abnormal, the probability of a stroke is 72%
Suspected Stroke Algorithm: Goals for Management of Stroke

Identify signs and symptoms of possible stroke
Activate Emergency Response

Critical EMS assessments and actions

- Support ABCs: Give Oxygen if needed
- Perform prehospital stroke assessment
- Check glucose
- Establish time of symptom onset (last normal)
- Triage to stroke centre
- Alert hospital
- Active stroke team

Immediate general assessment and stabilization

- Assess ABCs, vital signs
- Provide oxygen if O2 sat < 94%
- Obtain IV access and perform laboratory assessments
- Check glucose; treat if indicated
- Obtain 12-lead ECG

Immediate neurologic assessment by stroke team or designee

- Perform neurologic screening assessment
- Order emergent CT & MRI of brain

Does CT Scan Show Hemorrhage?

No Hemorrhage

- Probable acute ischemic stroke; consider fibrinolytic therapy
  - Check for fibrinolytic exclusions
  - Repeat neurologic exam: are deficits rapidly improving to normal?

- Patient remains candidate for fibrinolytic therapy?
  - NOT A CANDIDATE
  - Administer aspirin

- CANDIDATE
  - Review risks/benefits with patient & family. If acceptable:
    - Give tPA
    - No anticoagulants or antiplatelet treatment for 24 hours

  - Begin post-tPA stroke pathway
  - Aggressively monitor:
    - BP per protocol
    - For neurologic deterioration
  - Emergent admission to stroke unit or intensive care unit

Hemorrhage

- Consult neurologist or neurosurgeon; consider transfer if not available.