A. Acute myocardial infarction (AMI) and unstable angina (UA) are part of a spectrum of clinical disease collectively identified as acute coronary syndromes (ACS).

1. ACS is the result of cardiac ischemia, when the heart muscle is not receiving an adequate amount of oxygen, glucose and other nutrients to meet its needs.
2. This can be due to a serious narrowing which prevents enough blood flow at peak demand (exertional angina) or a complete obstruction usually by a blood clot in the case of a myocardial infarction (MI).
3. The process by which blood vessels narrow is termed coronary artery disease. This happens gradually with aging but is accelerated by hypertension, diabetes, high cholesterol and smoking. There are additional genetic factors, so a strong family history of cardiac disease is very predictive and concerning in a patient with chest pain.

B. Classically, ACS is described as burning, heavy or tight, located in the center or towards the left side of the chest, radiating to the jaw or left arm and accompanied by dyspnea, diaphoresis, nausea and/or vomiting.

1. In reality, there may be no pain, or it may radiate to the right side. Some patients may simply complain of dyspnea and fatigue. Also, the pain may even be reproducible by palpation of the chest wall! These atypical findings are more likely seen in the elderly, diabetics and women.

C. Because prompt recognition of an MI is necessary, a 12-lead ECG should be obtained in the prehospital setting as soon as possible on all patients suspected of having an angina or infarct.

1. A non-diagnostic and/or a normal 12-lead ECG does not necessarily rule out an infarct or other serious issues. Always treat the patient.

D. Patients with cardiac ischemia or infarction are at an increased risk of developing a dysrhythmia or cardiac arrest and should be closely monitored enroute to the hospital.

E. Treatment is geared at reducing myocardial oxygen demand and improving / restoring blood flow to ischemic tissue.

1. Nitroglycerin reduces blood pressure and the workload of the heart, and this reduces myocardial oxygen demand. Nitroglycerin also dilates the coronary arteries, which increases blood flow to the heart.
2. Pain management can reduce anxiety and the amount of stress hormones released.
A. Assess and manage airway:
   1. Administer oxygen as needed to treat shock and/or respiratory distress
   2. Apply pulse oximeter and treat per pulse oximeter procedure

B. Acquire and transmit 12-lead ECG if properly trained and available. See 12-Lead ECG Procedure. Repeat ECG if there is a change in patient condition or level of pain.

C. Evaluate patient’s general appearance, relevant history of condition and determine OPQRSTI and SAMPLE. Especially ask about cardiac history, stroke, recent surgeries, bleeding problems, risk factors, and family history. Ask patient to rate pain (1-10).

D. Patients with a history of angina may have prescription nitroglycerin tablets or spray. If patient is conscious and alert and has a systolic BP greater than 100 mmHg, administer a dose of the patient's nitroglycerin, either tablet or spray, sublingually. Assure that the medication is prescribed for the patient and is not outdated.

   Monitor patient’s condition, especially BP. Nitroglycerin dose may be repeated every 5 minutes, if the pain does not substantially subside, SBP remains > 100 mmHg and there is no change in the patient’s level of consciousness.

   If the patient has taken phosphodiesterase inhibitors to treat erectile dysfunction (e.g., Viagra, Cialis, or Levitra) within the last 24-48 hours, DO NOT administer nitroglycerin.

   Document medication given, dose, route, time and vital signs.

E. If the patient does not have their medication available, contact Medical Control and ask about administering nitroglycerin tablets from the drug box.

F. Assure than patient has no history of aspirin allergy or signs of active or recent gastrointestinal bleeding. Administer four 81 mg aspirins. Have patient chew then swallow the aspirin.

   Document medication given, dose, route, and time.

G. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes.

Advanced EMT

A. Apply monitor and assess rhythm

B. Start IV, saline, TKO while en route to hospital. DO NOT DELAY TRANSPORT. IV access is preferred prior to nitroglycerin administration, especially if patient’s vital signs are unstable. If patient’s blood pressure drops dramatically, hold further nitroglycerin and administer a 250 - 500 ml IV fluid bolus.

C. If patient is alert, complaining of severe pain and, SBP > 100 mmHg, see Pain Management Protocol.
A. If 12-Lead ECG reveals a STEMI – consult STEMI protocol (below) for further treatment options.

ST-segment elevation in the inferior MI is not an absolute contraindication to giving nitroglycerin, but it is a warning that the blood pressure may drop and fluid boluses may need to be given. Likewise if the patient is already hypotensive, 250-500 ml saline boluses can and should be administered in an effort to increase preload and cardiac output.

B. Treat cardiac dysrythmias per protocol.

C. Transport to appropriate medical facility.

ST ELEVATED MYOCARDIAL INFARCTION “STEMI”

GENERAL CONSIDERATIONS

A. Patients with a STEMI should be transported to a facility capable of percutaneous interventions (PCI) whenever possible. The stability of the patient and distance to the facility should be considered when making the transport decision. As always, any unstable patient should be transported to the closest, most appropriate facility for stabilization. While the goal of restoring blood flow through the occluded artery is generally achieved with PCI, it is helped by the administration of certain medication such as aspirin and Brilinta.

B. There is a small, but direct relationship between time of chest pain onset and arrival to a cardiac catheterization lab to mortality. Once a STEMI is recognized every effort should be taken to transport quickly, but safely, to the hospital. Certain interventions, e.g., history taking, can be completed en route to the hospital.

C. This protocol is to be used in conjunction with the receiving facility as a way to expedite patients to the cardiac cath lab and to minimize cardiac muscle damage in the interim by the administration of certain medications.
A. **Do NOT** delay transport with a suspected MI.
   1. Transmission of the 12-Lead ECG should be attempted prior to contacting the receiving facility.
   2. If necessary, leave a call back number.

### PREHOSPITAL ACTIVATION OF THE CATH LAB

**FOR AKRON CITY HOSPITAL ONLY**

1.) EMS team reviews ECG
   a. Tracing without artifact
   b. ST elevation in two contiguous leads
   c. Reciprocal changes
2.) Machine interprets STEMI (“ACUTE MI SUSPECTED” or “MEETS ST ELEVATION CRITERIA”)
3.) Call STEMI line, Activate STEMI System
4.) Transmit ECG to ED
5.) Begin **Remote Ischemic Conditioning** (RIC) as soon as possible.
6.) Call report and notify the ED the STEMI System was activated.
7.) If activation is confirmed by emergency department use of STEMI medications is authorized.
   a. **Ticagrelor (Brilinta)** 180 mg po
   b. **Heparin** 60 units/kg to a maximum dose of 4000 units IVP

**AKRON CITY HOSPITAL STEMI LINE (330) 375-7888**
ACUTE CORONARY SYNDROME

- Assess and manage airway
- Maintain O2 SATS to 95%
- Evaluate patient condition
- Acquire and transmit 12-lead ECG
- Monitor vital signs
- Obtain medical history
- Reassure patient
- Administer **baby aspirin** four 81mg tablets
- Administer **nitroglycerin** one tablet or spray if systolic BP above 100 mmHg. May repeat as needed if systolic BP remains greater than 100 mmHg *(basic EMT must contact medical control for permission to use nitroglycerin from drug box.)*
- Transport in position of comfort

- Monitor ECG
- IV NS (run to maintain perfusion)
- Consider pain management protocol

- Consult STEMI protocol if 12 lead ECG reveals STEMI
- Treat cardiac dysrhythmias per protocol
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AKRON CITY HOSPITAL STEMI LINE: (330)375-7888