

CARDIAC-RELATED SIGNS/SYMPTOMS & STEMI**SIGNS & SYMPTOMS:**

1. Typical or atypical chest pain w/ or w/o radiation
2. Feeling of impending doom & denial
3. Shortness of breath
4. Nausea & vomiting
5. Jugular vein distention & pedal edema
6. Neuro: syncope or dizziness
7. Skin: pale, cyanotic, clammy or diaphoretic
8. Abnormal vital signs (fast, slow, high, low, irregular) or arrhythmias

OBTAIN HISTORY OF:

1. Cardiorespiratory disease
2. Onset & duration
3. Quality & severity (on a scale of 1 - 10)
4. Relieving factors (nitro, rest, antacids)
5. Meds (esp. cardiac & impotence)
6. Recent illness or trauma
7. PMH/Meds/Allergies
8. Substance abuse
9. DNR/DNI status

PRECAUTIONS:

1. This guideline refers to spontaneously breathing and perfusing patients and follows **AHA ECC 2005 guidelines**.
2. Syncopal episodes in patients may be cardiac related.
3. Do not allow the AED to shock a conscious patient.
4. Nitroglycerine is contraindicated if there was a recent use (within 24-48 hours) of Viagra (sildenafil), Levitra (vardenafil), or Cialis (tadalafil).

MEDICAL FIRST RESPONDER:

1. Assess and support ABCs.
2. Begin high flow supplemental oxygen via non rebreather with goal to obtain SpO₂ > 95%.
3. Assess vital signs (BP, pulse, respirations, O₂ sats) and lung sounds frequently, especially after each medication or if unstable.
4. Place patient in position of comfort and reassure.

BASIC LIFE SUPPORT:

1. Initiate ECG monitoring. Obtain initial 12-Lead ECG if cardiac etiology is suspected.
2. Administer up to 324 mg aspirin. (Four 81 mg Children's tablets chewed) if patient has not had any in the last 4 hours.
3. For chest pain of presumed cardiac origin, EMT-B's may assist patient with their physician prescribed NTG from their bottle. Can administer up to 3 tablets/sprays. Further orders must come from medical control.
4. Monitor vital signs.

INTERMEDIATE TECH:

1. Attempt to establish IV of NS TKO.
2. Assure ASA has been given.
3. For chest pain of presumed cardiac origin:
 - A. Administer 0.4 NTG tablet/spray SL every 5 min. if pain persists and systolic BP remains > 90 up to a total of 3 tablets or sprays. Contact medical control for further orders.
4. For hypotension:
 - A. If systolic BP falls < 90, administer a 250 cc NS fluid bolus and repeat vitals.
5. For pulmonary edema:
 - A. Contact medical control for NTG orders.

INTERMEDIATE 99 & PARAMEDIC/RN: In addition to above and as appropriate:

1. Repeat 12-Lead ECG before and after any significant intervention or change in patient condition.
2. Consider second TKO IV line if patient is potential thrombolytic candidate. Administer 250-500 mL fluid bolus for hypotension related to right sided MI.
3. For pain relief: (goal is to eliminate pain)
 - a. Administer 0.4 NTG tablet or spray SL q. 3 – 5 min. if pain persists and systolic BP is > 90.
 - b. Paramedics/RN's may consider nitroglycerine drip (begin at 10 to 20 mcg/min titrated to effect, increase by 5 to 10 mcg/min every 5-10 min until desired effect) if patient has ST elevation or depression and shows signs/symptoms.
 - c. Consider Morphine in increments of 1 – 4 mg every 5-10 minutes up to a total of 16 mg titrated to patient pain.
 - d. Paramedic/RN contact medical control to administer Metoprolol 5 mg.
4. For arrhythmias:
 - a. Symptomatic and significant PVC's (frequent, coupled, multiformed, or close coupled), automatic internal cardiac defibrillator firing, and non-sustained V-tach:
 - i. Administer Amiodarone 150 mg IV/IO slowly (over 2-3 minutes) **or** Administer Lidocaine 1 mg/kg followed by infusion of 2 mg/min. A second Lidocaine dose of 0.5 mg/kg may be given 5 minutes after first bolus if indicated.
--Use ½ lidocaine dose if pt over 70 years old or has a renal history
 - b. V-tach (**QRS > 0.12 seconds**)
 - i. Unstable V-tach (symptomatic patient with ventricular rate > 150 bpm)
 1. Perform synchronized cardioversion @ 100 J. Repeat @ 200, 300, 360 J or equivalent biphasic setting if no change.
 2. Consider Morphine 1-4 mg for pain management up to 16 mg total.
 3. Paramedic/RN consider premedicating with Valium 5mg IV/IO or Versed 2mg IV/IO or Etomidate 0.2 mg/kg IV/IO.
 4. Administer Amiodarone 150 mg IV/IO slowly (over 2-3 minutes) or Lidocaine 0.5-0.75 mg/kg bolus. Paramedic/RN may establish infusion at 1 – 4 mg/min if rhythm converts.
--Use ½ lidocaine dose if pt over 70 years old or has a renal history.
 - ii. Stable V-tach (pulse \geq 150 bpm)
 1. Administer Amiodarone 150 mg IV/IO slowly (over 2-3 minutes) **or** administer lidocaine 0.5-0.75 mg/kg IV. May be repeated in 5 min. at 0.5 mg/kg if indicated. Establish infusion at 1 – 4 mg/min if rhythm converts on lidocaine.
--Use ½ lidocaine dose if pt over 70 years old or has a renal history
 - c. (PSVT) Paroxysmal supraventricular tachycardia (**QRS < 0.12 seconds**)
 - i. Unstable (symptomatic patient with pulse > 150 bpm):
 1. Perform synchronized cardioversion @ 100 J. Repeat @ 200, 300, 360 J or equivalent biphasic setting if no change.
 2. Consider Morphine 1 – 4 mg for pain management up to 16 mg total.
 3. Paramedic/RN consider premedicating with Valium 5mg IV/IO or Versed 2mg IV/IO or Etomidate 0.2 mg/kg IV/IO.
 - ii. Stable:
 1. Attempt vagal maneuvers.
 2. Administer Adenosine 6 mg rapid IV bolus followed by fluid flush. Obtain ECG while administering Adenosine.
 3. If no change, repeat adenosine 12 mg rapid IV followed by fluid flush.
 4. If no change, repeat adenosine 12 mg rapid IV followed by fluid flush.

5. Contact medical control for additional doses.
- d. Atrial fib or flutter:
 - i. Unstable (symptomatic patient):
 1. Contact medical control physician if patient has been in atrial fib/flutter for more than 48 hours.
 2. Consider Morphine 1 – 4 mg IV prior to or after cardioversion up to 16 mg total.
 3. Paramedic/RN consider premedicating with Valium 5mg IV/IO or Versed 2mg IV/IO or Etomidate 0.2mg/kg.
 4. Perform synchronized cardioversion starting @ 100 J. Repeat at 100, 200, 300, 360 J or equivalent biphasic setting if no change.
 - ii. Stable: Continue monitoring with frequent reassessment.
- e. Bradycardia:
 - i. Unstable (symptomatic patient with pulse < 60 bpm):
 1. Administer atropine 0.5 mg IV/IO (unless 2nd degree type two or 3rd degree heart block) up to 3 mg.
 2. If no change, begin IMMEDIATE pacing:
 3. Consider Morphine 1-4 mg IV for pain management up to 16 mg total.
 4. Paramedic/RN consider premedicating with Valium 5mg or Versed 2mg or Etomidate 0.2 mg/kg IV/IO.
 - A) Place defib/pacer pads anterior/posterior
 - a) Set rate @ 80.
 - b) Turn pacer on.
 - c) Begin output @ 0 mA and quickly increase by 5 or 20 mA until consistent electrical capture is observed.
 - d) Assess for mechanical capture (check pulses).
 - e) Increase mA by additional 10% to ensure patient remains in capture.
 5. If no change, consider second dose of atropine 0.5 mg IV push.
 6. Paramedic/RN may consider Epinephrine infusion (2 to 10 mcg/min) or Dopamine infusion (2 to 10 mcg/kg/min) if pacing ineffective.
 - ii. Stable: Continue monitoring with frequent reassessment.
5. For hypotension:
 - a. Administer 200-250cc NS fluid bolus. May repeat fluid challenge if hypotension continues.
 - b. Paramedic/RN may consider Dopamine infusion (2 to 20 mcg/kg/min) if systolic BP is 70-100 mm Hg and signs/symptoms of shock exist.
6. For acute pulmonary edema, if systolic blood pressure is ≥ 90 mmHg:
 - a. Administer 0.4 mg NTG SL every 3-5 min to patient response.
 - b. Administer morphine 1 – 4 mg IV/IO slowly titrated to patient response up to 16 mg total.
 - c. Consider CPAP therapy.
 - d. Administer 40 mg of Lasix IV/IO.
 - e. Consider Albuterol/Atrovent neb if lung sounds are hard to assess or if rales are questionably wheezes. **Note:** use this only if options a-d do not improve patient. Albuterol increases heart rate and also oxygen consumption of the heart.
 - f. For acute pulmonary edema with signs/symptoms of shock and systolic BP 70-100 mm Hg, Paramedics/RN's may consider dopamine infusion 2 to 20 mcg/kg/min and nitroglycerine infusion 10 to 20 mcg/min.
7. Further orders must come from monitoring physician.
8. Paramedic/RN consider Dilaudid 1-2 mg IV/IO titrated to effect if patient is allergic to Morphine.

PEDIATRIC CONSIDERATIONS:

1. Do not perform cardioversion on any conscious patient < 12 years without physician order.

2. For cardiac pain from known cardiac origin/history:
 - A. If child is ≥ 2 years of age, administer one 81 mg tablet of aspirin. (EMT-B & up only)
 - B. Further orders must come from medical control.

SPECIAL NOTES:

1. In the setting of an acute myocardial infarction, rapid assessment, treatment, and undelayed transport are essential to avoid further delays to in-hospital treatment, such as thrombolytics and angioplasty.
2. Use caution when giving nitroglycerine to patients who have right sided acute AMI.

PARAMEDIC/RN STEMI PROCEDURE:

1. Used in conjunction with St. Paul Heart Clinic and United Hospital Level one heart attack guidelines.
2. Early recognition of acute ST-elevation myocardial infarction on 12-Lead ECG is important.
Inclusion criteria for a "STEMI" patient will include:
 - a) Patient has cardiac symptoms (chest pain, SOB, etc.)
 - b) ST-elevation greater than 2 mm in two or more contiguous leads
 - c) EMS provider findings are consistent with the ECG monitor interpretation
3. Initiate oxygen therapy.
4. Consider adjunctive therapy:
 - a) Administer 162 to 324mg ASA
 - b) Nitroglycerine 0.4mg SL, repeat as needed. Consider IV 12.5 to 25 mcg bolus (only if no SL given) then infusion of 10 to 20 mcg/min titrated to effect.
 - c) Morphine Sulfate 1 to 4 mg as needed for pain up to 16 mg
 - d) Sedation: consider 2mg increments versed for transport
 - e) Contact medical control for administration of Metoprolol 5 mg IV/IO.
5. Repeat 12 Lead ECG after each intervention to show trends.
6. Contact medical control:
 - a) To advise them of the STEMI patient.
 - b) For permission to administer Heparin (loading dose of 60 units/kg, 4000 units max) followed by continuous infusion at 12 units/kg/hr, round to nearest 50 units (1000 units max for patients > 70 kg).
7. Patients with acute ST-Elevation should be transported directly to a facility that can have the patient in their cath lab within 60 minutes and have balloon inflation under 90 minutes. Regions, United and St. Joseph's Hospitals in St. Paul meet this criteria.
8. Call the St. Paul Heart clinic BAT FONE to facilitate patient transport to United Hospital and early revascularization. Phone #: 1-866-228-3663.
9. Contact receiving hospital directly or through East Metro control for patient updates enroute.



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