Cardiac Arrest – General

This protocol should be followed for adult cardiac arrests. Medical cardiac arrest patients undergoing attempted resuscitation should not be transported unless return of spontaneous circulation (ROSC) is achieved, transport is ordered by Medical Control, or otherwise specified in protocol.

- If an arrest is of a known traumatic origin, refer to the **Traumatic Arrest -Treatment Protocol**.
- If it is unknown whether the arrest is traumatic or medical, and the patient does not meet dead on scene criteria per **Dead on Scene Termination of Resuscitation-Procedure Protocol**, start CPR and continue with this protocol.
- If patient is hypothermic refer to **Hypothermia/Frostbite-Treatment Protocol** for warming techniques when applicable.
- Patients displaying a Do Not Resuscitate (DNR) order, bracelet, or necklace; or valid Michigan Physician Orders for Scope of Treatment (MI POST) – follow **DNR-Procedure Protocol** or **MI-POST-Procedure Protocol** accordingly.

- Cardiac arrest patients undergoing resuscitation should only be moved if the scene is unsafe, the physical location of the patient does not permit appropriate treatment, or under a direct medical control order.

HIGH QUALITY CPR & DEFIBRILLATION

Focus should be on prompt defibrillation and effective chest compressions.

- CPR and electrical therapy should be consistent with current American Heart Association guidelines. For all patients, **anterior/posterior placement** of pads is preferred and should be used, if possible, and if defibrillation not delayed.
- For all devices defibrillate with energy levels following manufacturers' recommendations.
    - If unknown use the maximum available

Excellent CPR is a priority:

- Keep pauses in CPR to a minimum by checking rhythm when rotating rescuer doing compressions and by avoiding pauses in CPR during airway management and other interventions. CPR pauses should be kept to less than 10 seconds.
- Use End Tidal Carbon Dioxide (ETCO2) monitoring throughout resuscitation.
- CPR initial sequence is CAB (Compressions, Airway, Breathing), except in drowning or obvious respiratory cause which should use the ABC (Airway, Breathing, Compressions) sequence.
- Chest compression rate is 100 to 120/min.
- Chest compression depth for adults is 2 inches (5 cm
- Compressions and ventilations in a ratio of 30:2
- Supraglottic airways are an acceptable primary advanced airway device (i.e., considered at least as good as endotracheal intubation) for patients in cardiac arrest with exceptions noted in the **Airway Management-Procedure Protocol.**

- Transition to continuous compressions with asynchronous ventilations every 6 seconds after placement of an advanced airway.
- Allow complete chest recoil after each compression.
- Minimize interruptions in compressions. Reassess rhythm and pulses every 2 minutes or when prompted by defibrillator.
- Avoid hyperventilation.
- Minimize compression pauses during defibrillation by doing compressions while defibrillator is charging (if device allows) and restart compressions immediately after defibrillation.
- For pregnant patients, a rescuer should manually displace the uterus to the patient's left during CPR.
    - Pregnant patients may be difficult to ventilate due to increased intrabdominal pressure, monitor end tidal CO2 and SpO2
- Change rescuers doing compressions at least every 2 minutes to avoid fatigue.
- After advanced airway placement, and if personnel available, consider positioning 2 personnel (one each side) to quickly alternate in compressions (100 per person then alternate) without pauses.

OPERATIONAL CONSIDERATIONS

1. Prior to advanced airway placement, utilize ventilation periods to visualize the ECG rhythm without compression artifact, this will allow you to plan for the assessment period at the end of the two-minute CPR cycle.
2. If AED has been applied by BLS personnel, skip to appropriate place in protocol that incorporates previous care. ALS personnel should switch to manual defibrillator after initial AED defibrillation or place AED in manual mode.

PROCEDURE

1. Request additional assistance, as needed, and initiate ALS response, if available.
2. Confirm Arrest
    a. Assess breathing (cardiac arrest patients may have gasping or agonal breathing).
    b. Check a carotid/femoral pulse for not more than 10 seconds. If uncertain if pulse is present, initiate CPR.
    c. Patients with Left Ventricular Assist Device (LVAD) **refer to LVAD- Procedure Protocol**
3. Initiate CPR or continue CPR; apply and use AED/defibrillator (per **Electrical Therapy-Procedure Protocol**) as soon as available.
    a. For refractory v-fib after 3 shocks, consider double sequential defibrillation per **Double Sequential Defibrillation-Procedure Protocol** (MCA Optional Protocol)
4. Ensure high quality CPR
    a. Manual chest compressions remain the standard of care for the treatment of cardiac arrest. Mechanical chest compression devices may only be used as alternative to conventional CPR in specific settings where the delivery of high-quality manual compressions may be challenging or dangerous for the

provider (e.g., inadequate numbers of rescuers available, CPR during hypothermic cardiac arrest, CPR in a moving ambulance). See **Mechanical Chest Compression Device-Procedure Protocol** (MCA Optional Protocol)

b. An impedance threshold device may be utilized during CPR, if available. Device should be discontinued immediately upon return of spontaneous circulation. See **Impedance Threshold Device-Procedure Protocol** (MCA Optional Protocol)

c. An FDA-approved Active Compression-Decompression CPR device may be used, if available, in accordance with manufacturer's instruction for use and should be used in conjunction with an ITD (see **Active Compression-Decompression-Procedure Protocol**)

5. Establish a patent airway, maintaining C-Spine precaution if indicated, using appropriate airway adjuncts and high flow oxygen**.** See **Airway Management-Procedure Protocol.**
   a. Initiate bag-valve-mask ventilation
      i. 2-person bag-valve-mask ventilation with oral airway should be used
      ii. If only 2 rescuers, rescuer performing compressions can squeeze bag while 2nd rescuer maintains face to mask seal with both hands.
   b. Consider advanced airway (supraglottic or endotracheal) placement without interrupting chest compressions to allow for continuous compressions.
      i. Confirm placement through EtCO2 and physical examination
      ii. Ventilations delivered asynchronously at 10 breaths per minute or 1 breath every 6 seconds when using an advanced airway.
6. Reassess ABC's as indicated by rhythm or patient condition change. Pulse checks should take no more than 10 seconds. If no pulse after 10 seconds, assume pulselessness, continue CPR beginning with compressions.
7. Continuously monitor $EtCO_2$ per MCA selection in **End-Tidal Carbon Dioxide Monitoring-Procedure Protocol**.
   a. EtCO2 of 0 is indicative of failed airway.
   b. If EtCO2 is <10 mmHG, attempt to improve CPR quality. If CPR quality good, may indicate futility state.
   c. Monitor EtCO2 for trends and indications of patient status.
8. Start an IV/IO **NS** or **LR** KVO. If IV is attempted and is unsuccessful, after 2 attempts start an IO line per **Vascular Access & IV Fluid Therapy-Procedure Protocol.**
   a. Give one liter **NS** or **LR** bolus, monitor for pulmonary edema. May repeat bolus as necessary to a maximum of 2 liters.
9. Administer **epinephrine** 1 mg/10 ml administering 1 mg IV/IO every 3 to 5 minutes.
10. Administer antidysrhythmic according to rhythm check
    a. For Ventricular Fibrillation (VF, pulseless Ventricular Tachycardia (VT), or multiple AED defibrillations, per MCA selection, administer **amiodarone** 300 mg IV/IO or **lidocaine** 1 mg/kg IV/IO

Per MCA Selection

☑ **amiodarone** 300 mg IV/IO (May repeat once 150 mg IV/IO)

☐ **lidocaine** 1 mg/kg IV/IO (May repeat, every 5-10 minutes, 0.5 mg/kg, up to total dose of 3 mg/kg)

b. For suspected torsades de pointes administer **magnesium sulfate** 2 g IV/IO

11. Consider and treat reversible causes of cardiac arrest. NOTE: Sodium bicarbonate and calcium chloride are not to be routinely given in cardiac arrest UNLESS clear reason to suspect conditions below.
    a. If known or highly suspected tricyclic antidepressant overdose, administer:
        i. **sodium bicarbonate** 1 mEq/kg IV/IO
    b. If known or highly suspected hyperkalemia (e.g., dialysis patient, EKG changes) administer:
        i. **calcium chloride** (10%) 1 gm/10 mL IV/IO
        ii. FLUSH line with 20 mL **NS** between calcium chloride and sodium bicarbonate administration
        iii. **sodium bicarbonate** 1 mEq/kg IV/IO
    c. Assess for tension pneumothorax or misplaced ETT:
        i. If tension pneumothorax suspected, perform needle decompression per **Pleural Decompression-Procedure Protocol**.
    d. If known or highly suspected opioid overdose
        i. Patent airway and adequate ventilation takes precedence over pharmacological interventions.
        ii. Consider **naloxone** 2 mg IV/IO or 2-4 mg IN refer to **Opioid Overdose Treatment and Prevention-Treatment Protocol**
12. If sustained ROSC is achieved refer to **Return of Spontaneous Circulation-Treatment Protocol**
    a. Reassess for ROSC (check pulses) if $EtCO_2$ abruptly increases by more than 10 mmHg.
13. If ROSC is not achieved, continue resuscitation while contacting Medical Control
    a. BLS/LALS: If ROSC has not been achieved and ALS is not available or is delayed, contact Medical Control after **20 minutes** of high-quality CPR for further direction AND before initiating transport. Continue high quality CPR unless directed otherwise by Medical Control per **Dead on Scene & Termination of Resuscitation Protocol**.
    b. ALS: If ROSC is not present after **30 minutes of ALS time** contact Medical Control for further direction AND before initiating transport.
    c. Continue high quality CPR unless directed otherwise by Medical Control per **Dead on Scene & Termination of Resuscitation Protocol**.

Notes:

1. Chest Compression Fraction (CCF) is the proportion of time during cardiac arrest when compressions are being performed. CCF should be as high as possible, ideally greater than 80% [American Heart Association, ACLS (2020), pg.115].

2. Document tube placement confirmation by $EtCO_2$ and by auscultation as described above and/or use of other MCA approved secondary confirmation device.
3. Identify and communicate to Medical Control potentially reversible causes. Treat EMS reversible causes, using other protocols, as applicable.
    A. Hyper/hypokalemia (known renal failure), other metabolic disorders
    B. Hypothermia
    C. Hypovolemia (including vomiting/diarrhea)
    D. Hypoxia
    E. Hydrogen ion excess (acidosis)
    F. Toxins/ overdose (e.g., beta-blocker or calcium channel-blocker)
    G. Tamponade
    H. Tension pneumothorax
    I. Thrombosis (pulmonary or coronary)
4. Routine use of **sodium bicarbonate** and **calcium chloride** in cardiac arrest is not indicated.
5. If ROSC is achieved refer to **Return of Spontaneous Circulation -Treatment Protocol**
    A. Where available transport to an interventional cardiac catheterization facility, per MCA Transport Protocol

<u>Medication Protocols:</u>
Amiodarone
Calcium Chloride
Epinephrine
Lidocaine
Magnesium Sulfate
Naloxone
Sodium Bicarbonate

Protocol Source/References: Highlights of the 2020 AHA Guidelines Update for CPR and ECC

Bradycardia

This protocol is for paramedic use only

This is a protocol for patients with serious symptomatic bradycardia, defined as patients with heart rate less than 60 bpm and hypotension, or shock. Titrate treatments to a heart rate above 60 bpm. If the patient remains hypotensive, refer to the **Shock Treatment Protocol**.

1. Follow the **General Pre-Hospital Care-Treatment Protocol**.
2. Administer **atropine** 1 mg IV/IO rapid push repeating every 3-5 minutes to a total dose of 3 mg IV/IO, until a heart rate of greater than 60/minute is reached.
3. Transcutaneous pacing (TCP) when available may be initiated prior to establishment of IV access and/or before **atropine** begins to take effect. Pacing is the treatment of choice for high degree A-V block (second-degree Type II, or third-degree), apply pacer pads. Follow the **Electrical Therapy- Procedure Protocol.**
4. Per MCA selection, provide sedation per **Patient Procedural Sedation-Procedure Protocol**
5. For patients with persistent symptomatic bradycardia, administer **epinephrine** by push dose (dilute boluses)
    a. Prepare (10 mcg/mL) by adding 1mL of 1mg/10mL **epinephrine** in 9mL **NS**, then:
        i. Administer 10-20 mcg (1-2 mL **epinephrine** 10 mcg/mL) IV/IO
        ii. Repeat every 3 to 5 minutes
        iii. Titrate SBP greater than 90 mmHg

Notes:

1. Consider possible etiologies:
    A. Hyper/hypokalemia, other metabolic disorders
    B. Hypothermia
    C. Hypovolemia (including vomiting/diarrhea)
    D. Hypoxia
    E. Hydrogen ion excess (acidosis)
    F. Toxins/ overdose (e.g., beta-blocker or calcium channel-blocker)
    G. Tamponade
    H. Tension pneumothorax
    I. Thrombosis (pulmonary or coronary)
2. Transcutaneous pacemaker electrode pads may be applied to these patients without initiating pacing so that the pacemaker is ready if patient condition deteriorates.
3. For symptomatic high-degree (second-degree Type II, or third-degree) AV block, begin pacing without delay.
4. Heart transplant patients may not respond to **atropine**

<u>Medication Protocols</u>
Atropine
Epinephrine

Protocol Source/References: Highlights of the 2020 AHA Guidelines Update for CPR and ECC

Return of Spontaneous Circulation (ROSC)

This protocol should be followed for all cardiac arrests with ROSC. If an arrest is of a known traumatic origin, refer to the **Traumatic Arrest -Treatment Protocol** and MCA Transport Protocol. If it is unknown whether the arrest is traumatic or medical, consider other treatable causes. Initiate ALS response if available. After ROSC, patients should be stabilized on scene prior to transport, for five to ten minutes before moving the patient. Refer to **Crashing Adult /Impending Arrest-Treatment Protocol.**

1. If ventilation assistance is required, ventilate at 10-12 breaths per minute. Do not hyperventilate.
2. Monitor vital sign and reassess patient. If patient becomes pulseless begin CPR and refer to **Adult Cardiac Arrest General-Treatment Protocol**.
3. Check blood glucose (may be MFR skill, see **Blood Glucose Testing-Procedure Protocol**
4. Start an IV/IO **NS** or **LR** KVO if not already in place**.**
5. Treat hypotension (systolic blood pressure less than 90 mm/Hg) with an IV/IO fluid bolus of up to 1 liter.
6. Perform 12- lead ECG (Per MCA selection, may be BLS or Specialist skill per **12 Lead ECG-Procedure Protoco**l)
7. Consider Transport to a facility capable of Percutaneous Coronary Intervention (PCI) per MCA protocol if 12 Lead ECG indicates ST Elevation MI.
8. Monitor waveform ETCO2. If ventilation assistance is required, target ETCO2 of 35-45 mm Hg per **End Tidal Carbon Dioxide Monitoring-Procedure Protocol**
9. If hypotension persists after initial IV/IO fluid bolus, prepare push dose **epinephrine** while administering second 1 liter fluid bolus (maximum total fluid 2 liters)
10. Administer **epinephrine** by push dose (dilute boluses).
    a. Prepare (10 mcg/mL) by adding 1mL of 1mg/10mL **epinephrine** in 9mL NS, then:
        i. Administer 10-20 mcg (1-2 mL **epinephrine** 10 mcg/mL)
        ii. Repeat every 3 to 5 minutes
        iii. Titrate to SBP greater than 90 mm/Hg
11. Anticipate airway intolerance and prepare for patient sedation. If patient becomes agitated with advanced airway in place, refer to **Patient Procedural Sedation-Procedure Protocol.**

Notes:

1. If a mechanical ventilator is available or there are spontaneous respirations in the non-intubated patient, titrate inspired oxygen on the basis of monitored SpO2 to maintain a saturation of ≥92% but <98%. Titrate ETCO2 between 35-45 mmHg.
2. Consider removal of airway device only if wide awake, following commands, and unable to tolerate airway device.

<u>Medication Protocols</u>
Epinephrine

Chest Pain/Acute Coronary Syndrome

The goal is to reduce cardiac workload and to maximize myocardial oxygen delivery by reducing anxiety, appropriately oxygenating, and relieving pain. For non-cardiac causes of chest pain, refer to appropriate protocol which may include **Pain Management-Procedure Protocol.**

1. Follow **General Pre-Hospital Care Protocol.**
2. Obtain 12-lead as early as possible without delaying medication administration. (Per MCA selection, may be a BLS or Specialist procedure, follow **12 Lead ECG Procedure-Protocol**)
3. Administer oxygen 4 L/min by nasal cannula if SpO2 < 94%.
4. Assist patient in the use of their own **aspirin** up to a dose of 325 mg and per formulation (chew, swallow, etc.).
5. Administer **aspirin** up to 325 mg PO, chew and swallow, if no aspirin or suspected insufficient dose since the onset of chest pain. (Per MCA selection may be MFR and/or EMT skill)

Aspirin Administration
☐ MFR ☐ EMT

6. Inquire of all patients, regardless of identified gender, if they have taken an erectile dysfunction medication or medications used to treat pulmonary hypertension in the last 48 hours.
   a. If yes, DO NOT ADMINISTER/ ASSIST WITH NITROGLYCERIN AND CONTACT MEDICAL CONTROL.
7. Consider **fentanyl** early when nitroglycerin is contraindicated due to erectile dysfunction medication (see 14 below for **fentanyl** administration).
8. If no erectile dysfunction medication, systolic BP is above 120 mmHG and patient has **nitroglycerin** sublingual tabs prescribed to them available (check expiration date) assist patient in use of their own nitroglycerin, up to a maximum of 3 doses.
9. Prior to IV administration, if no erectile dysfunction medication and systolic BP is above 120 mmHG, **nitroglycerin** 0.4mg sublingual may be administered up to a maximum of 3 doses. (Per MCA selection may be EMT skill)

Nitroglycerin Administration
☐ EMT

10. Start an IV **NS** or **LR** KVO per **Vascular Access and IV Fluid Therapy-Procedure Protocol**.
11. If the patient has a SBP of less than 100 mmHg:
    a. Administer 250 ml fluid bolus. May repeat 3 times for a total of 1 liter.
    b. Between boluses assess patient response and monitor for pulmonary edema.
    c. If pulmonary edema is noted, stop fluids and contact Medical Control.

12. If no erectile dysfunction medication, IV has been established, and systolic BP is above 100 mmHG, administer **nitroglycerin** 0.4 mg sublingual. Dose may be repeated at 3-to-5-minute intervals if chest pain persists and systolic BP remains above 100 mmHg.
13. Obtain 12-lead ECG (Per MCA selection, may be a BLS or Specialist procedure, follow **12 Lead ECG Procedure-Protocol**). Follow local MCA transport protocol if ECG is positive for acute ST Elevation Myocardial Infarction (STEMI) and alert the hospital as soon as possible.
14. For patients with suspected cardiac chest pain refractory to **nitroglycerin**, or **nitroglycerin** is contraindicated due to erectile dysfunction medication, consider f**entanyl** administration:
    a. Administer 1 mcg/kg IV/IO/IM/IN dosage rounded as per below:
        a. Up to and including 25 kg - administer 25 mcg
        b. 26-50 kg – administer 50 mcg
        c. 51-75 kg - administer 75 mcg
        d. 76 kg and above – administer 100 mcg
        e. IV/IO/IN may repeat one-time, total dose may not exceed 200 mcg
        f. If IM administration may NOT repeat

Medication Protocols: Aspirin, Fentanyl, Nitroglycerin

Pulmonary Edema/Cardiogenic Shock

This protocol is to be followed for patients in respiratory distress due to pulmonary edema with or without hypotension (i.e., CHF/fluid overload or Cardiogenic Shock). Pulmonary edema usually presents with crackles which should be continuously evaluated as they may evolve with treatments.

1. Follow **General Pre-Hospital Care-Treatment Protocol**.
2. Initiate supplemental oxygen by non-rebreather mask.
3. Position patient upright with legs dependent, if possible.
4. Consider CPAP per **CPAP-Procedure Protocol**
5. Establish IV access without delaying treatment per **Vascular Access & IV Fluid Therapy-Procedure Protocol**.
6. If wheezing, administer **albuterol** 2.5 mg/3ml **NS** nebulized (Per MCA selection may be EMT skill) per **Medication Administration-Medication Protocol**

Nebulized **albuterol** administration per MCA selection
☑ EMT

7. If crackles (with or without wheezing) administer **nitroglycerin** as outlined below.
   a. Inquire of all patients regardless of identified gender if they have taken an erectile dysfunction medication or medications used to treat pulmonary hypertension in the last 48 hours.
      i. If yes, DO NOT ADMINISTER NITROGLYCERIN AND CONTACT MEDICAL CONTROL.
   b. Prior to IV administration if no erectile dysfunction medication and systolic BP is above 120 mmHG, **nitroglycerin** 0.4mg sublingual may be administered up to a maximum of 3 doses.
   c. If SBP above 100 mmHg (with IV/IO in place), administer **nitroglycerin** 0.4 mg SL, repeat every 3-5 minutes if SBP remains above 100 mmHg.
   d. If wheezing continues, continue **nitroglycerin** 0.4 mg SL and consider: **albuterol/ipratropium bromide** per **Respiratory Distress-Treatment Protocol**
8. If SBP is below 100 mmHG treat for cardiogenic shock.
   a. Prepare (**epinephrine** 10 mcg/mL) by combining 1mL of 1mg/10mL **epinephrine** in 9mL **NS**
      i. Administer 20 mcg (2 mL e**pinephrine** 10 mcg/mL) IV/IO
      ii. Repeat every 3-5 minutes
      iii. Titrate SBP greater than 90 mm/Hg.
9. If indicated, consider an advanced airway see **Airway Management-Procedure Protocol**.
10. Obtain 12-lead ECG (May be a BLS or Specialist skill, per MCA selection, see **12 Lead ECG-Procedure Protocol**). Follow MCA transport protocol if ECG is positive for ST segment elevation myocardial infarction (STEMI) and alert hospital as soon as possible.

Medication Protocols
Albuterol
Epinephrine
Nitroglycerin

Tachycardia

This protocol is for paramedic use only

Aliases: Supraventricular Tachycardia (SVT), Ventricular Tachycardia (VT or V-Tach), Atrial Fibrillation with Rapid Ventricular Response (A-Fib with RVR)

- This protocol is used for the care of patients with persistent tachycardia (ventricular rate greater than or equal to 150/minute) where the tachycardia is believed to be the primary cause of the patient's symptoms.
- For rates <150, believed to be causing symptoms, contact Medical Control for possible orders. It is not intended to treat tachycardia that is secondary to underlying conditions (i.e., dehydration, trauma, sepsis, or toxins). Consultation with online medical control should be considered for complex patients in whom the cause of the arrhythmia is not obvious.
- Unstable patients may be defined as those with a tachycardia with: hypotension, acutely altered mental status, signs of shock, significant ischemic chest discomfort, shortness of breath, or pulmonary edema that is likely due to the arrhythmia. Unstable patients will usually have a ventricular rate >150 BPM.
- Note: Unstable patients with compensatory sinus tachycardia may resemble tachycardic arrhythmias but should not be treated as such. Treat underlying cause.
- **Adenosine** is only used for regular monomorphic tachycardic rhythm

1. Follow the **General Pre-Hospital Care-Treatment Protocol**.
2. Identify and treat reversible causes.
3. Determine if patient is stable or unstable.

UNSTABLE

1. Prepare for immediate cardioversion. In conscious patients consider sedation prior to electrical cardioversion per **Patient Procedural Sedation-Procedure Protocol**
2. Electrical cardioversion
   a. Perform synchronized cardioversion according to manufacturer recommendations.
   b. If unable to deliver synchronized cardioversion in polymorphic V Tach (including Torsades), defibrillate (cardiovert without synchronization) according to manufacturer recommendations (or device maximum energy dose)
   c. Contact medical control if the patient does not convert at maximum energy, for additional orders.

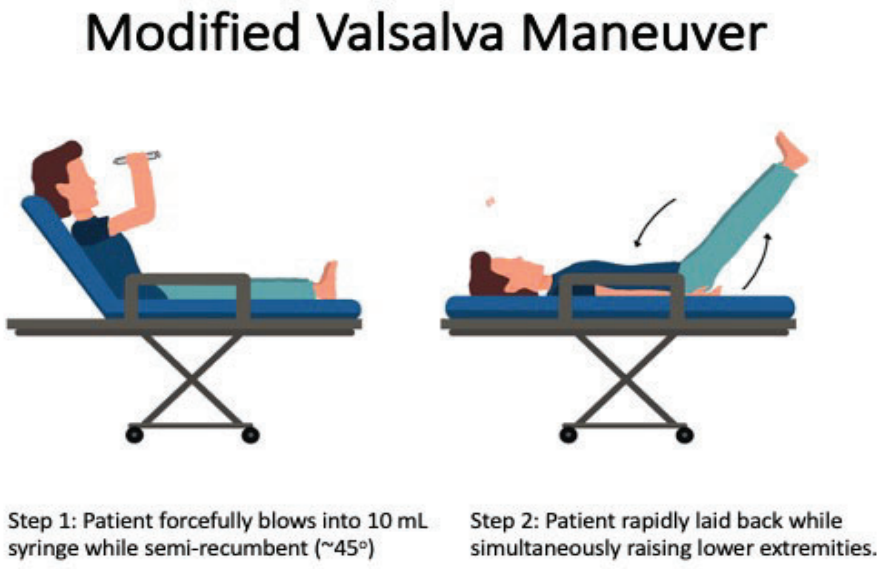
STABLE (But Symptomatic)

1. If at any point a patient becomes unstable, go to UNSTABLE section, and perform synchronized cardioversion.
2. Start an IV **NS** KVO. A large bore antecubital IV is preferred.
3. Obtain 12 lead ECG
4. Contact Medical Control for guidance as needed.

NARROW COMPLEX

REGULAR AND NARROW rhythm (i.e., SVT, A-flutter)

1. Perform Valsalva Maneuver with Postural Modification
    a. Provide continuous cardiac monitoring
    b. Run ECG strip during the procedure.
    c. DO NOT PERFORM CAROTID MASSAGE.
    d. Perform Valsalva Maneuver with Postural Modification (see Figure below)
        i. Place the patient in a semi-fowlers position
        ii. Instruct the patient to forcefully blow into a 10 mL syringe for 15 second
        iii. Then rapidly lower the patient's head to the horizontal position while simultaneously elevating the patient's legs for 60 seconds.



2. For suspected SVT that doesn't convert with Valsalva consider **adenosine** 6 mg rapid IV push through the most proximal injection site. This should be followed immediately with 20 ml **NS** flush.
    a. Adenosine may allow flutter waves to be visible indicating A-Flutter and should be treated as IRREGULAR AND NARROW rhythm below.
    b. If conversion does not occur, administer **adenosine** 12 mg IV using the same technique as stated above.
3. If SVT persists, treat according to MCA selection below.

Medication per MCA Selection

- ☐ **diltiazem** 15-20 mg (0.25 mg/kg) IV slowly
- ☐ **verapamil** 5 mg IV
- ☑ No medication, supportive therapy only

☐ Contact Medical Control prior to medication administration.

☐ Medication administration without Medical Control Contact

4. For suspected A-Flutter treat as IRREGULAR AND NARROW rhythm as below.

IRREGULAR AND NARROW rhythm (i.e., A-Fib/A-Flutter)

1. For suspected A-Fib/A-Flutter (per MCA selection), and if applicable, consider administration as below with Medical Control contact if indicated per MCA selection.
2. Note: treatment is indicated if heart rate is persistently above 125 BPM AND patient is

Medication per MCA Selection

- ☐ **diltiazem** 15-20 mg (0.25 mg/kg) IV slowly
- ☐ **verapamil** 5 mg IV
- ☑ **amiodarone** 150 mg IV over 10 minutes
- ☐ No medication, supportive therapy only

☑ Contact Medical Control prior to medication administration.

☐ Medication administration without Medical Control Contact

Symptomatic from arrhythmia (consider dehydration, hypovolemia, etc., for causes).

WIDE COMPLEX

REGULAR WIDE QRS rhythm (i.e., V-Tach, SVT/A-Flutter with aberrancy)

1. For suspected V-Tach administer **amiodarone** or **lidocaine** per MCA Selection.

Per MCA Selection

- ☑ **amiodarone** - 150 mg IV over 10 minutes
- ☐ **lidocaine** - 1 mg/kg IV

2. If V-Tach persists contact Medical Control and per Medical Control direction, administer:
   a. **amiodarone** 150 mg IV over 10 minutes as needed to a maximum of 450 mg
   OR
   b. **lidocaine** 0.5 -1.0 mg/kg IV push every 5 - 10 minutes to a maximum of 3 mg/kg.
3. For suspected SVT with aberrancy treat as REGULAR AND NARROW rhythm as above.
4. For suspected A-Flutter with aberrancy treat as IRREGULAR AND NARROW rhythm as above.

IRREGULAR WIDE QRS rhythm (i.e., torsades or A-Fib with aberrancy).

1. For suspected torsades administer **magnesium sulfate** 2 gm IV over 10 minutes.
2. For suspected atrial fibrillation with aberrancy follow irregular and narrow complex treatment as above.

NOTES:

1. Administration of **amiodarone** is best accomplished by adding **amiodarone** 150 mg to 100 or 250 ml of **NS** and infusing over approximately 10 minutes.
2. Administration of Magnesium Sulfate is best accomplished by adding **magnesium sulfate** 2 gm to 100 or 250 ml of **NS** and infusing over approximately 10 minutes.
3. Wide complex regular tachycardia may represent SVT with aberrancy, contact Medical Control and consider **adenosine**.

Medication Protocols
Adenosine
Amiodarone
Diltiazem
Lidocaine
Magnesium Sulfate
Verapamil

Protocol Source/References: REVERT Trial https://www.ecgmedicaltraining.com/wp-content/uploads/2016/06/REVERT-Trial-SVT.jpg)