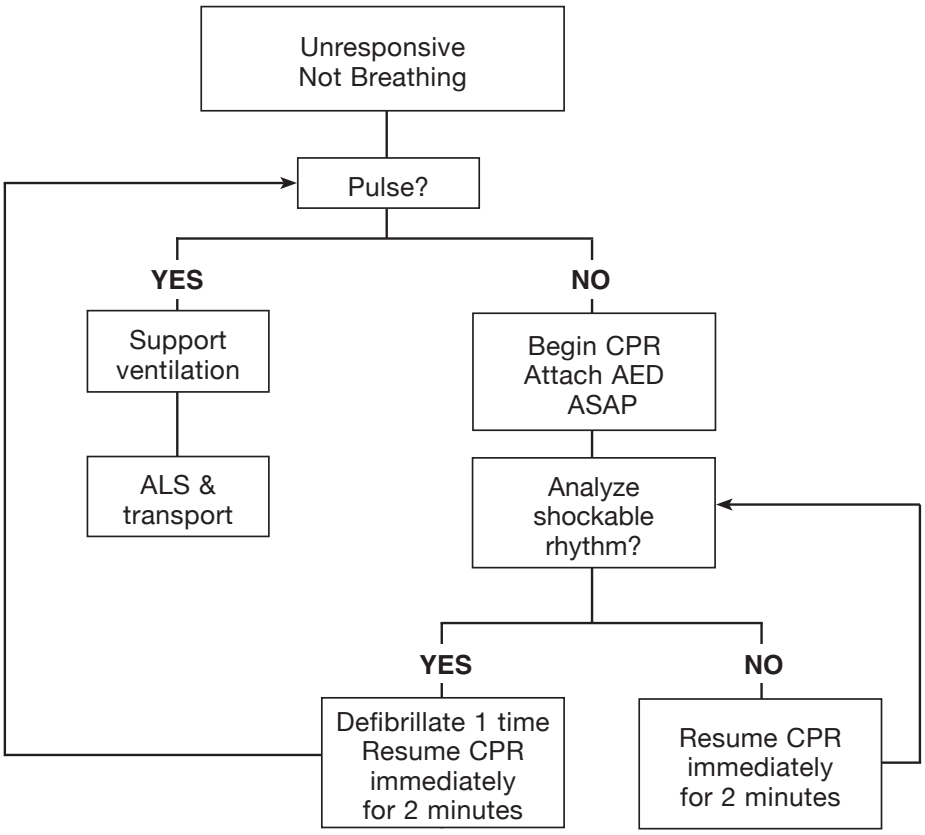
F. CARDIAC EMERGENCIES: NON-ARREST CARDIAC GUIDELINES

1. The following pertains to cardiac emergencies in patients who have a pulse. Several guidelines apply to all algorithms when assessing and treating cardiac patients. These guidelines are:
   a) When the patient's condition changes, indicating the transition to a new treatment algorithm, the new treatment shall take into account prior therapy (e.g., previously administered medications).
   b) As BLS/ALS guidelines indicate, definitive airway control is preferable; if this can be achieved, along with other initial interventions, then the earlier, the better. However, electrical therapy is more important if the patient can be ventilated without intubation.

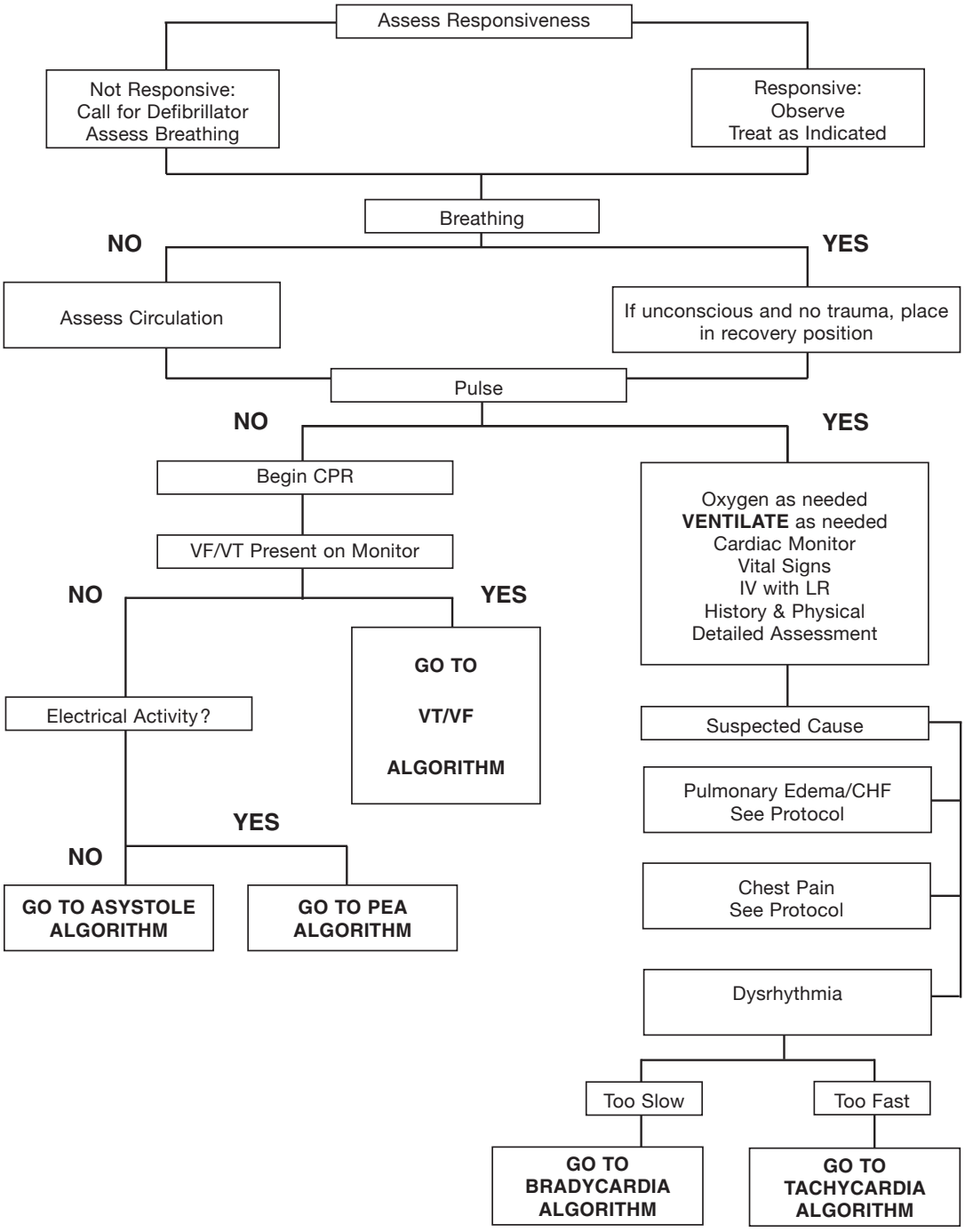
2.

UNIVERSAL ALGORITHM FOR ADULT EMERGENCY CARDIAC CARE FOR BLS



3.

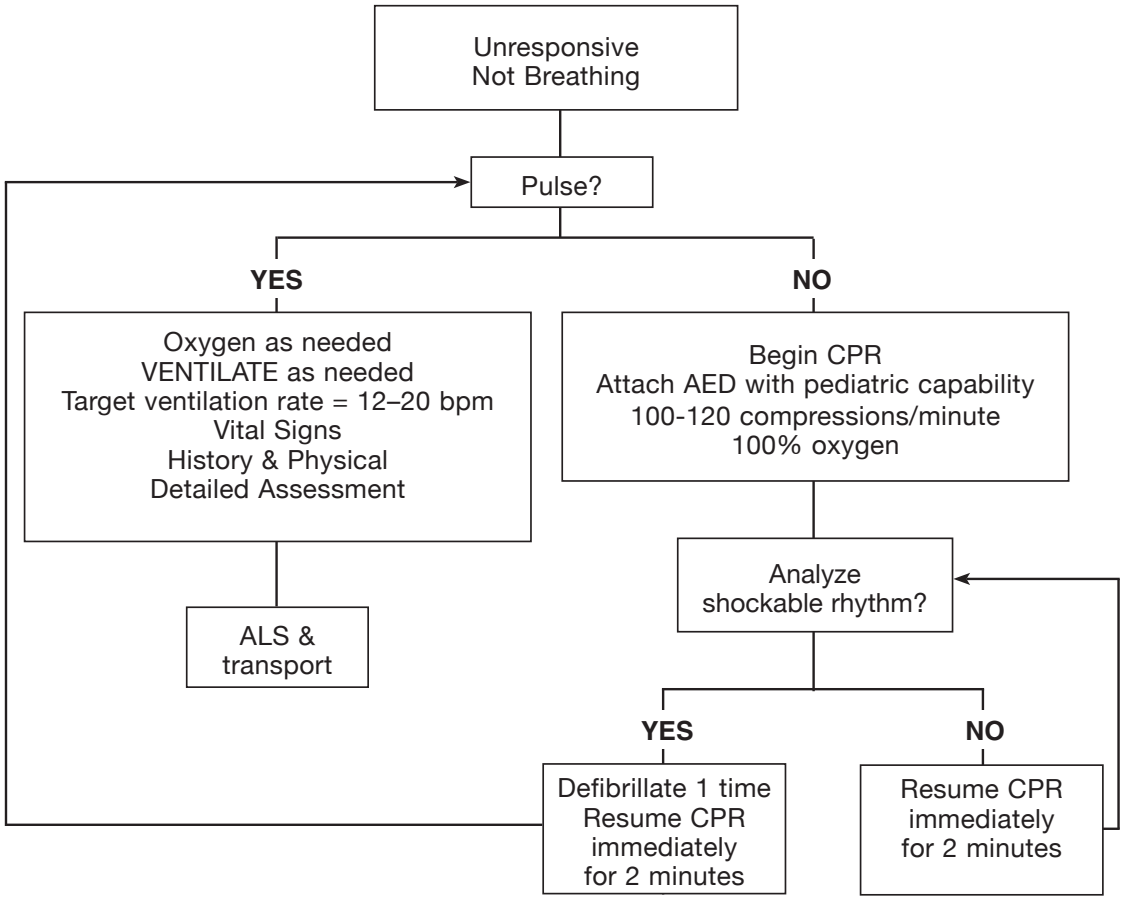
UNIVERSAL ALGORITHM FOR ADULT EMERGENCY CARDIAC CARE FOR ALS



Edition Date August 1, 2020
Release Date June 10, 2020

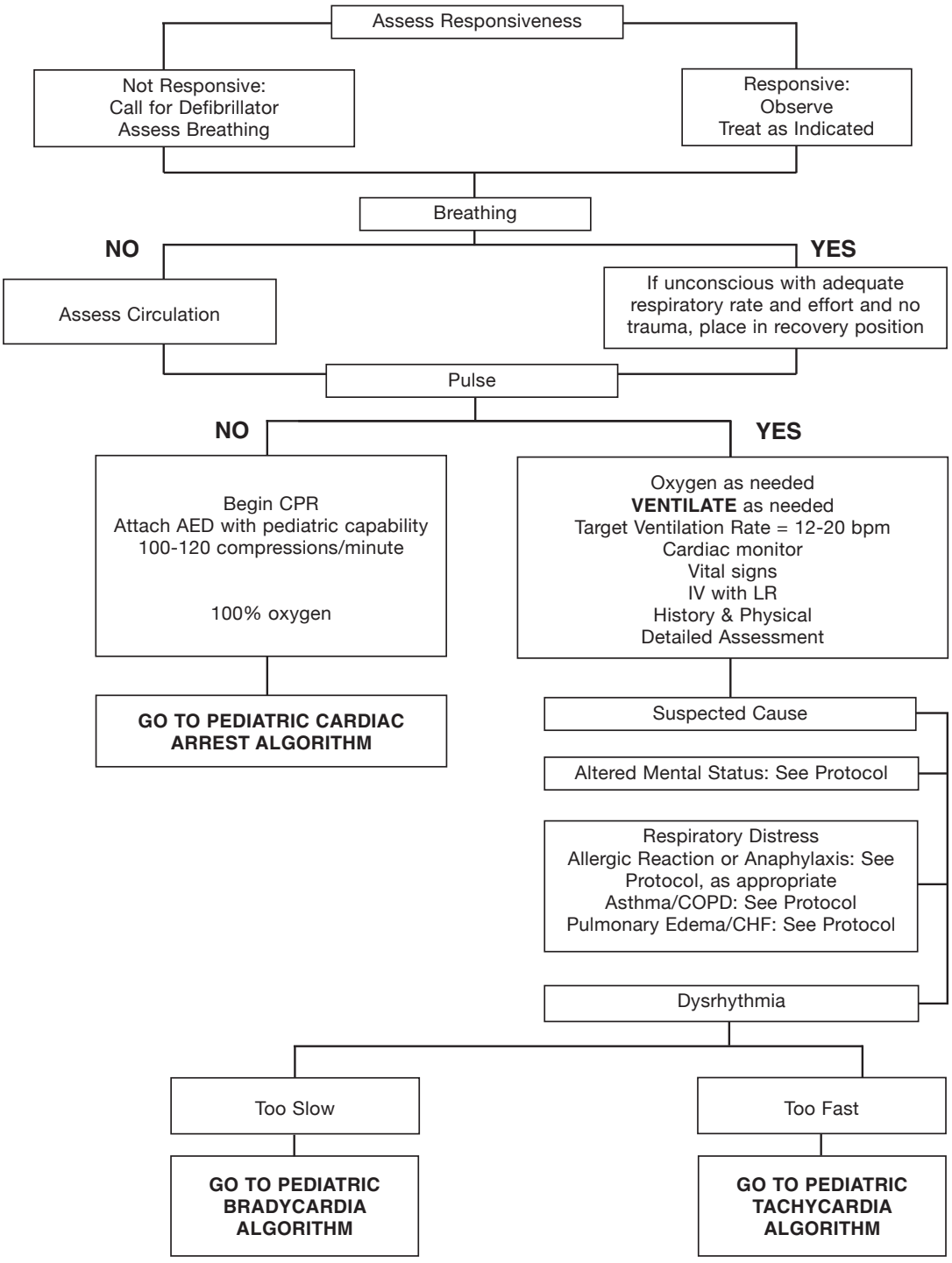
4.

UNIVERSAL ALGORITHM FOR PEDIATRIC
(GREATER THAN 1 HOUR AND LESS THAN 13 YEARS OF AGE)
EMERGENCY CARDIAC CARE FOR BLS
(If less than 1 hour old, refer to Newly Born Protocol)



5.

UNIVERSAL ALGORITHM FOR PEDIATRIC
(GREATER THAN 1 HOUR AND LESS THAN 13 YEARS OF AGE)
EMERGENCY CARDIAC CARE FOR ALS
(If less than 1 hour old, refer to Newly Born Protocol)



Edition Date August 1, 2020
Release Date June 10, 2020

G. CARDIAC EMERGENCIES: BRADYCARDIA

1. Inclusion Criteria

   Patient may present with a slow heart rate and chest pain, shortness of breath, decreased level of consciousness, hypotension, hypoperfusion, pulmonary congestion, congestive heart failure, and/or acute myocardial infarction.

2. Treatment

a) Place patient in position of comfort.

b) Assess and treat for shock, if indicated.

c) Continuously monitor airway and reassess vital signs every 5 minutes.

d) Establish IV access with LR.

e) If patient is hemodynamically unstable: initiate transcutaneous pacing (TCP).

f) If TCP is unsuccessful or not available, administer atropine:
0.5–1 mg IVP
Atropine should be given in repeat doses in 3–5 minute intervals up to a total of 0.04 mg/kg.

g) Consider epinephrine infusion at 1 mL/min (60 drops/min) using approved epinephrine infusion. If using an infusion pump, the epinephrine dose is 2-10 mcg/min.

Further dosing with medical consultation.

h) 

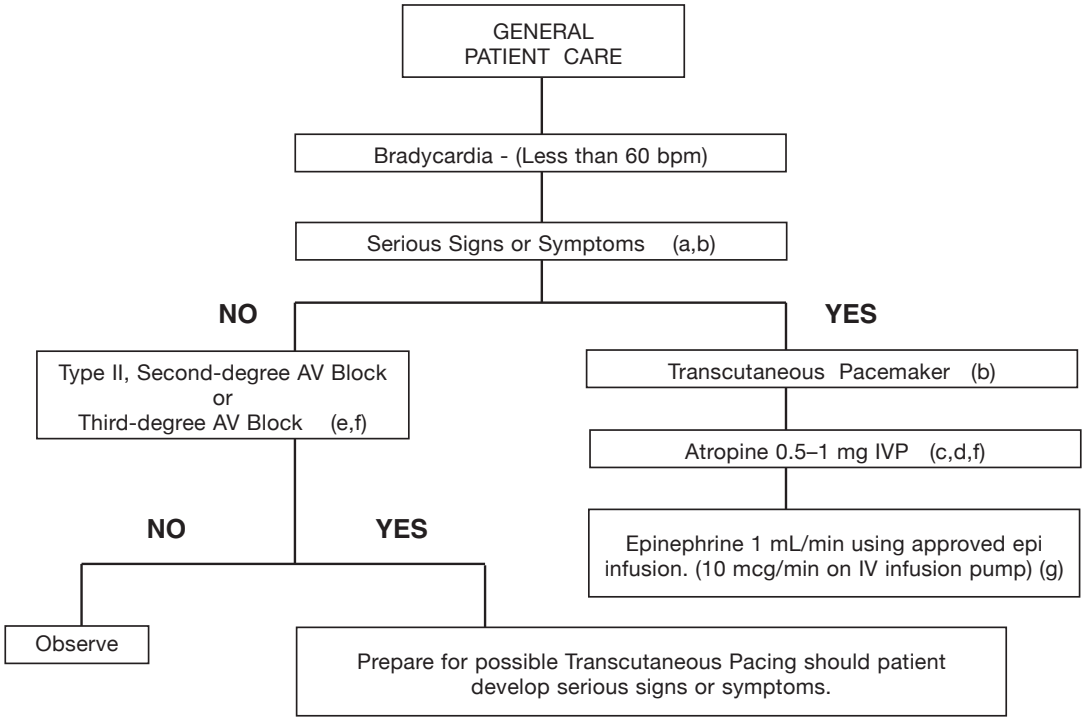
If patient is hemodynamically stable and in Type II, second-degree AV Block or third-degree AV Block:

(1) Consider/prepare for TCP.

(2) If patient develops discomfort with TCP
Administer opioid per Pain Management Protocol.
OR
Consider midazolam 0.1 mg/kg in 2 mg increments SLOW IVP over 1–2 minutes per increment with maximum single dose 5 mg.
(Reduce by 50% for patients 69 years or older.)

i) Refer to appropriate algorithm.

5. ADULT BRADYCARDIA ALGORITHM



(a) - Serious signs and symptoms must be related to the slow rate. Signs and symptoms may include chest pain, shortness of breath, decreased level of consciousness, hypotension, hypoperfusion, pulmonary congestion, CHF, and/or AMI.

(b) - Do not delay TCP while awaiting IV or atropine to take effect if the patient is symptomatic.

(c) - Denervated transplanted hearts will not respond to atropine. Go at once to TCP.

(d) - Atropine shall be given in repeat doses in 3–5 minute intervals up to a total of 0.04 mg/kg. Consider shorter intervals in severe clinical conditions.
Medical consultation required to administer atropine in AV block at the His-Purkinje level (Type II AV block and new third-degree block with wide QRS complexes).

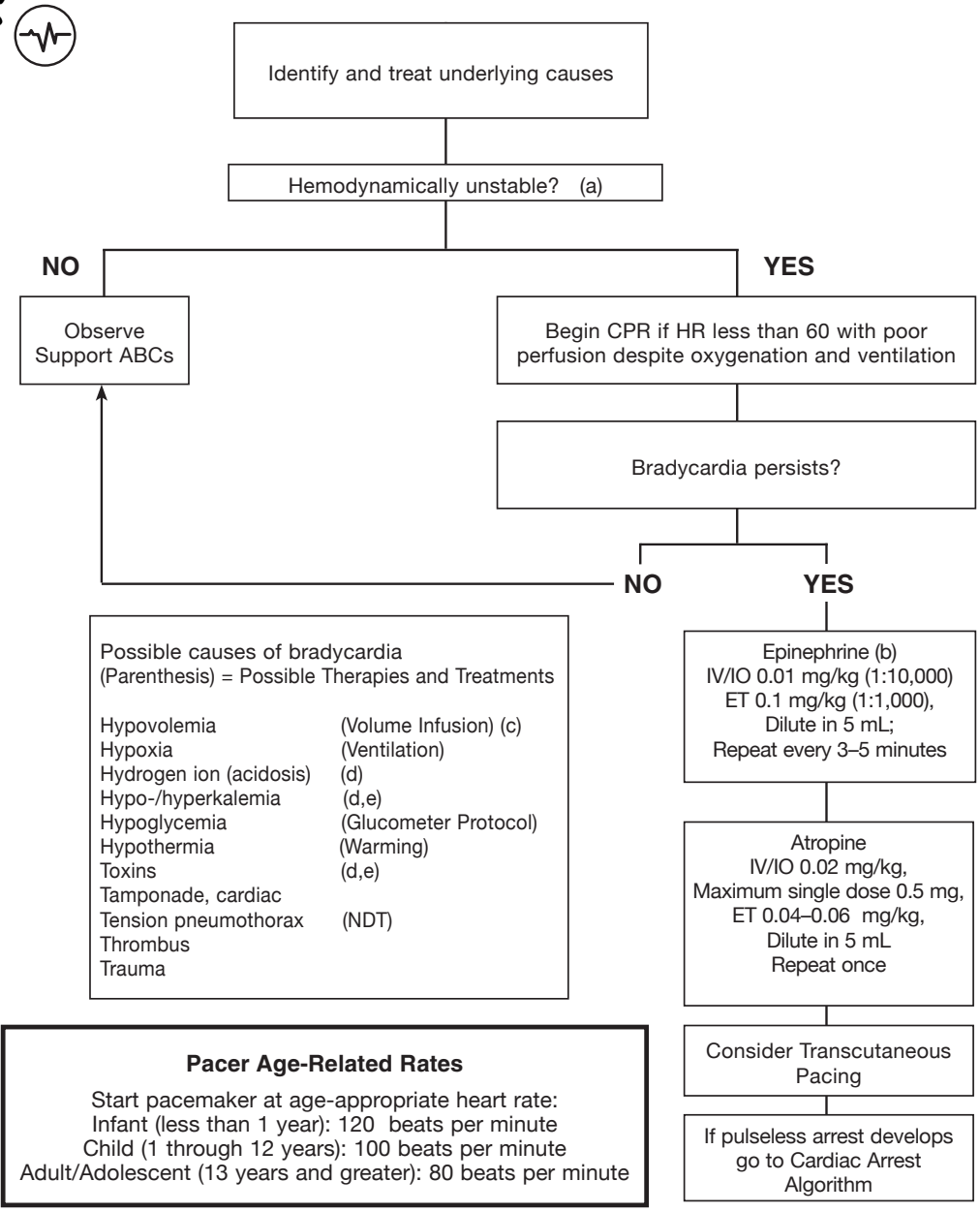
(e) - Never treat third-degree AV block or ventricular escape beats with amiodarone.

(f) - In the presence of Mobitz II and third-degree AV block, medical consultation is required for atropine administration.

(g) - Additional dosing above 1 mL/min (1 drop/second using 60 drop set and approved epinephrine infusion) requires medical consultation. Adults: titrate to systolic BP 90 mmHg.

6.

PEDIATRIC BRADYCARDIA ALGORITHM
(If less than 1 hour old, refer to Newly Born Protocol)



(a) - Hemodynamically unstable is defined as a systolic blood pressure less than 60 in neonates (patients less than 28 days old), less than 70 in infants (patients less than 1 year of age), and less than [70 + (2 x years) = systolic BP] for patients greater than 1 year of age.

(b) - Neonates (birth to 28 days), epinephrine ET 0.03 mg/kg (1:10,000) dilute with 1 mL.

(c) - Volume infusion for neonates and volume-sensitive children, 10 mL/kg; for infant and child 20 mL/kg.

(d) - Sodium Bicarbonate, 1 mEq/kg with medical consultation. See sodium bicarbonate.

(e) - Calcium chloride, 20 mg/kg (0.2 mL/kg) SLOW IVP/IO (50 mg/min). Max dose 1 gram.

H. CARDIAC EMERGENCIES: TACHYCARDIA

1. Inclusion Criteria
   Patient may present with chest pain, shortness of breath, decreased level of consciousness, low blood pressure, hypoperfusion, pulmonary congestion, congestive heart failure, and/or acute myocardial infarction.

2. Treatment
   a) Place patient in position of comfort.

   b) Assess and treat for shock, if indicated.

   c) Continuously monitor airway and reassess vital signs every 5 minutes.

   d) Establish IV access with LR.

   e) Verify presence of pulse.

   f) If no pulse present, treat as pulseless VF/VT.

   g) If patient is hemodynamically unstable with a ventricular rate greater than 150, prepare for immediate cardioversion.

   h) If patient is hemodynamically stable, identify rhythm and proceed to appropriate algorithm.

   i) Place patient in position of comfort.

   j) Assess and treat for shock, if indicated.

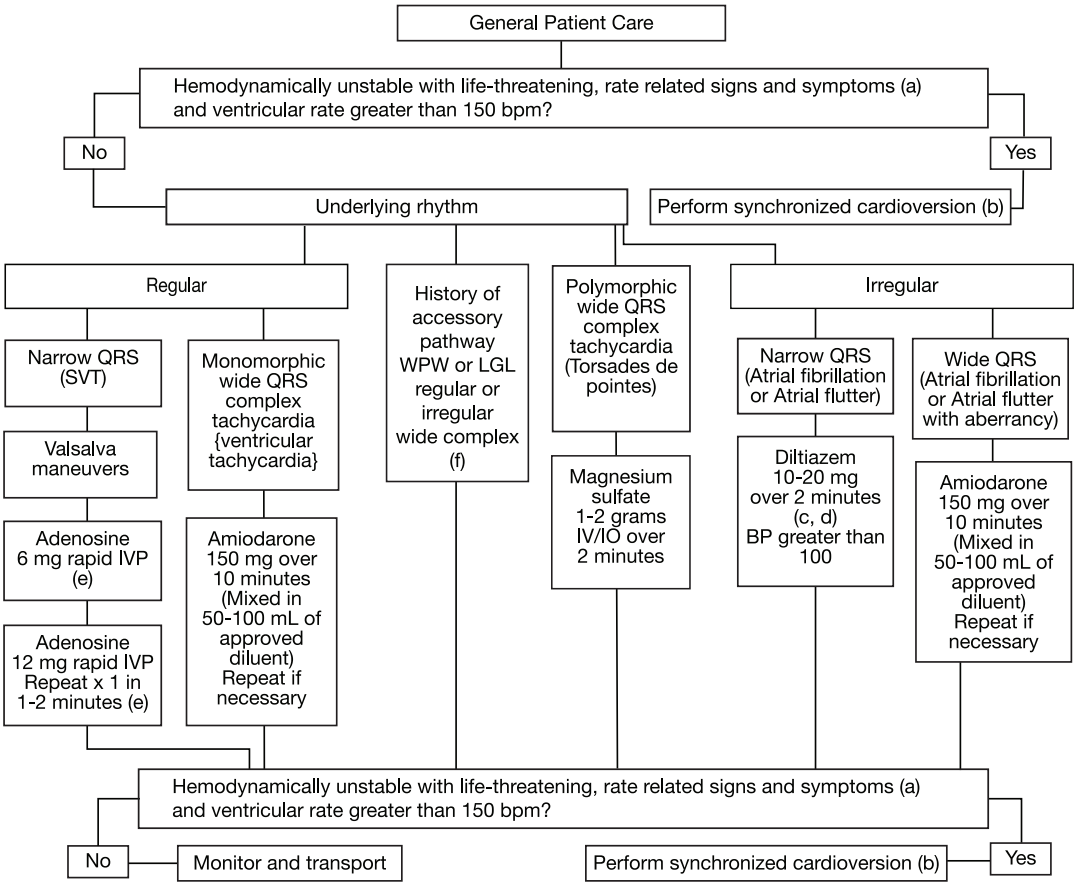
   k) Continuously monitor airway and reassess vital signs every 5 minutes.

   l) Establish IV access with LR.

   m) Verify presence of pulse.

   n) If no pulse present, treat as pulseless VF/VT.

5. ADULT TACHYCARDIA ALGORITHM



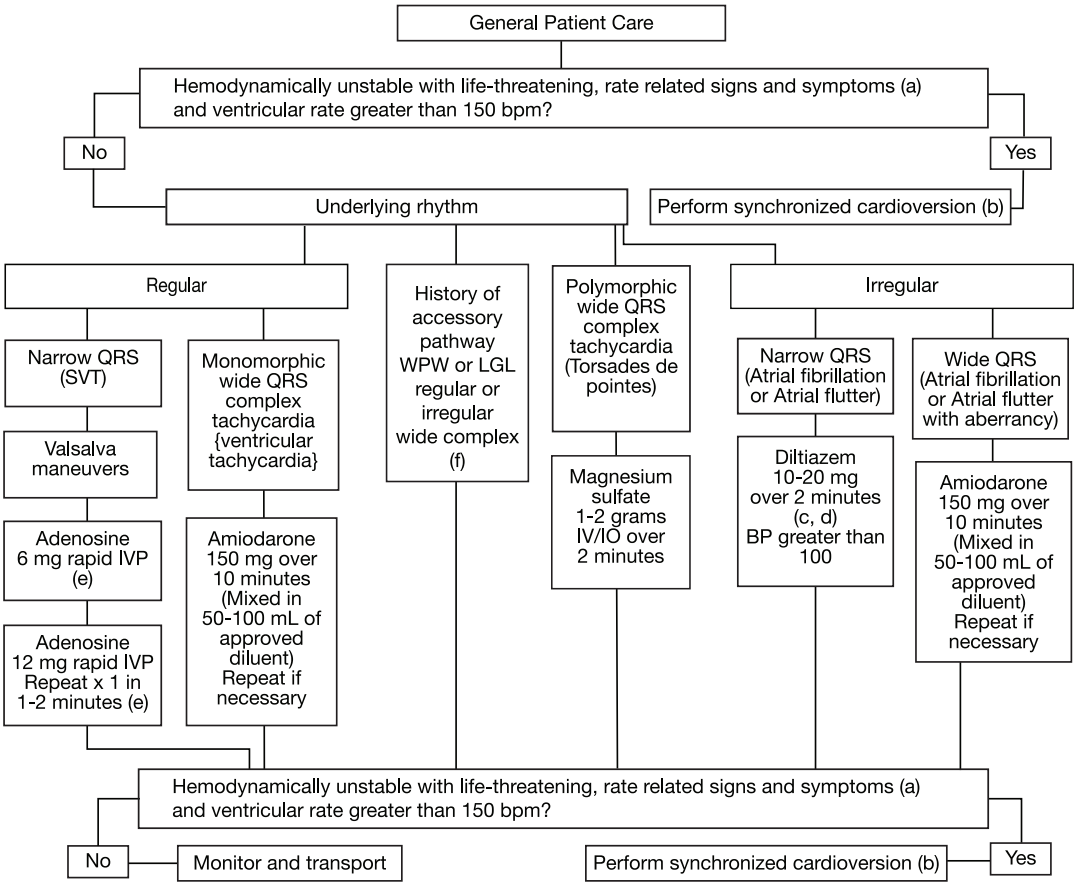
(a) - Signs and symptoms related to tachycardia: hypotension, acutely altered mental status, signs of shock, ischemic chest discomfort/AMI, or acute heart failure
(b) - Consider sedation (midazolam). However, overall patient status, including BP, may affect ability to administer sedative.
(c) - Consider calcium chloride 500 mg IVP for hypotension induced by diltiazem.
(d) - If rate does not slow in 15 minutes, administer a second dose of diltiazem (15 –25 mg over 2 minutes).
(e) - Be prepared for up to 40 seconds of asystole.
(f) - These rhythms include Wolff-Parkinson White (WPW) syndrome, Lown–Ganong–Levine syndrome (LGL), and Mahaim type.

H. CARDIAC EMERGENCIES: TACHYCARDIA (Continued)

o)  If patient is hemodynamically unstable with a ventricular rate greater than 220 for an infant or 180 for a child, prepare for immediate cardioversion.

p) If patient is hemodynamically stable, identify rhythm and proceed to appropriate algorithm.

5. ADULT TACHYCARDIA ALGORITHM

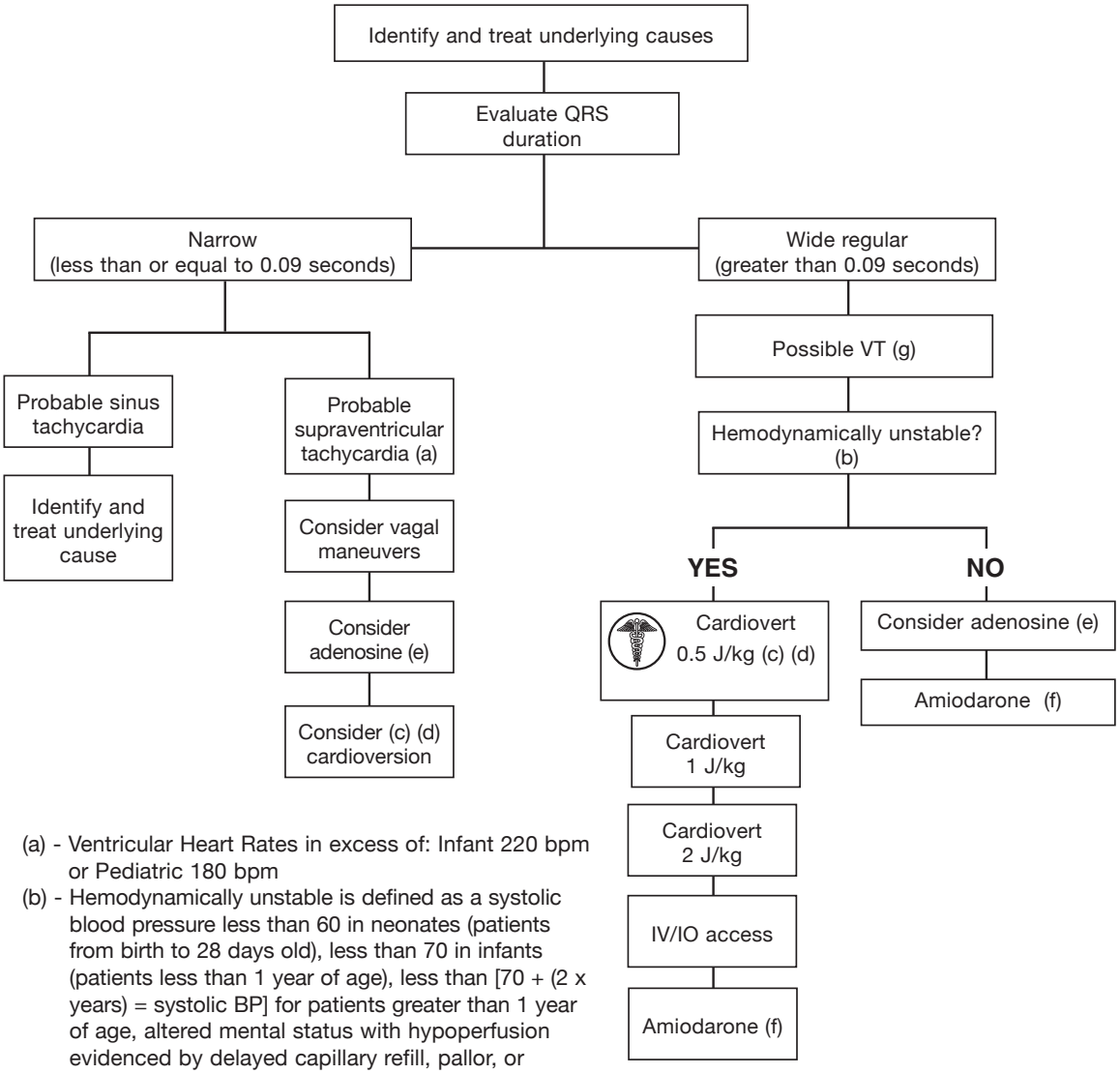


(a) - Signs and symptoms related to tachycardia: hypotension, acutely altered mental status, signs of shock, ischemic chest discomfort/AMI, or acute heart failure
(b) - Consider sedation (midazolam). However, overall patient status, including BP, may affect ability to administer sedative.
(c) - Consider calcium chloride 500 mg IVP for hypotension induced by diltiazem.
(d) - If rate does not slow in 15 minutes, administer a second dose of diltiazem (15 –25 mg over 2 minutes).
(e) - Be prepared for up to 40 seconds of asystole.
(f) - These rhythms include Wolff-Parkinson White (WPW) syndrome, Lown–Ganong–Levine syndrome (LGL), and Mahaim type.

6.

PEDIATRIC TACHYCARDIA ALGORITHM

(If less than 1 hour old, refer to the Newly Born Protocol)



(a) - Ventricular Heart Rates in excess of: Infant 220 bpm or Pediatric 180 bpm

(b) - Hemodynamically unstable is defined as a systolic blood pressure less than 60 in neonates (patients from birth to 28 days old), less than 70 in infants (patients less than 1 year of age), less than [70 + (2 x years) = systolic BP] for patients greater than 1 year of age, altered mental status with hypoperfusion evidenced by delayed capillary refill, pallor, or peripheral cyanosis.

(c) - If calculated joules setting is lower than cardioversion device is able to deliver, use the lowest joules setting possible or obtain medical consultation.

(d) - Consider sedation (midazolam with medical consultation). However, overall patient status, including BP, may affect ability to administer sedative.

(e) - Adenosine: 0.1 mg/kg rapid IV/IO, maximum 6 mg. Second and third doses 0.2 mg/kg rapid IV/IO, maximum single dose 12 mg. Be prepared for up to 40 seconds of asystole. (Contraindicated in polymorphic or irregular wide complex tachycardia)

(f) - Amiodarone: 5 mg/kg IV/IO over 20 minutes (mixed in 50 - 100 mL of approved diluent). Obtain 12-lead EKG prior to administration of amiodarone.

(g) If torsades de pointes, administer magnesium sulfate (25 mg/kg IV/IO to a maximum of 2 grams over 2 minutes).

I. CARDIAC EMERGENCIES: CARDIAC ARREST

1. Inclusion Criteria
   Patient must be unconscious, apneic, and pulseless.

2. Treatment
   a) Perform high quality uninterrupted chest compressions as soon as possible and until defibrillator available.
   b) Apply AED as soon as available.
   c) Follow machine prompts regarding rhythm analyses and shocks.
   d) Limit breaks in compressions to rhythm analysis periods and during shocks; perform compressions while defibrillator is charging.

ALERT ALS CLINICIANS WITH A COMBINATION AED/MANUAL DEFIBRILLATOR SHOULD USE IT IN THE MANUAL MODE TO MINIMIZE BREAKS IN COMPRESSIONS CAUSED BY AED ANALYSIS.

   e) **On-scene resuscitation:** patients who are found in arrest or who arrest prior to transport and are **attended to by BLS clinicians must only be resuscitated in place** (with minimal movement, no attempts at patient loading, and no attempts at transport) until the following have been accomplished:
      (1) **Medical Etiologies**
         (a) The patient has received a minimum of five two-minute cycles of rhythm interpretation and chest compressions.
      (2) **Trauma Etiologies**
         (a) Penetrating trauma patients should receive the indicated reversible causes treatments listed in section BBB–Trauma Protocol: Trauma Arrest, lines a) through h) of Treatment, while loading and preparing for immediate transport.
         (b) Blunt trauma patients should receive all indicated reversible causes treatments listed in section BBB–Trauma Protocol: Trauma Arrest, lines a) through h) of Treatment, while on scene before termination of resuscitation or transport if ROSC is achieved.
      (3) **Exemptions** from on-scene resuscitation:
         (a) Where physical barriers prevent resuscitation
         (b) Where clinicians are in danger
         (c) Pregnant patients
         (d) Patients in cardiac arrest thought to be secondary to hypothermia or submersion
   f) **Following the initial on-scene resuscitation above,** clinicians may choose to continue the on-scene resuscitation until termination of resuscitation or to transport the patient at any time. Clinicians should ensure the following prior to transport:
      (1) Mechanical CPR (mCPR) in place (if available)

4. ADULT ASYSTOLE ALGORITHM

- Continue CPR
- Assure adequate ventilation
- Establish IV access with LR
- Confirm asystole in more than one lead

Epinephrine (1:10,000) 1 mg IV/IO push every 4 minutes up to a max of 4 doses for the initial arrest. If arrest occurs after ROSC, an additional 2 doses may be administered. **(NEW '20)**

Consider Possible Causes

Consider possible causes of asystole.
(Parenthesis) = Possible Therapies and Treatments

Hypovolemia	(Volume Infusion) (c)
Cardiac Tamponade	(Volume Infusion) (c)
Tension Pneumothorax	(Needle Decompression Thorocostomy–NDT)
Massive Pulmonary Embolism	
Massive AMI	
Drug Overdose	(a,b)
Hypoxia	(Ventilation)
Hypothermia	(Warming)
Acidosis	(a)
Hyperkalemia	(a,b)

(a) - Sodium bicarbonate 1 mEq/kg, with medical consultation. See sodium bicarbonate.

(b) - Calcium chloride, 0.5–1 gram IVP. See calcium chloride.

(c) - Volume infusion is 20 mL/kg.

I. CARDIAC EMERGENCIES: CARDIAC ARREST (Continued)

ALERT HIGH-QUALITY CONTINUOUS CHEST COMPRESSIONS WITH FREQUENT CLINICIAN ROTATION IS AN ESSENTIAL COMPONENT IN THE SUCCESSFUL RESUSCITATION OF THE CARDIAC ARREST PATIENT. THIS MAY BE ACCOMPLISHED ENTIRELY WITH MANUAL COMPRESSIONS, OR INITIALLY WITH MANUAL AND THEN MECHANICAL COMPRESSIONS, IN ACCORDANCE WITH THE OPTIONAL MECHANICAL CPR (MCPR) PROTOCOL. THE USE OF MCPR IS CONTRAINDICATED IN PATIENTS WHO HAVE NOT YET REACHED THEIR 13TH BIRTHDAY.

g) Assess for shockable rhythm at next appropriate interval and treat appropriately.
h) Minimize peri-shock pauses of compressions to less than 10 seconds.
i) Any interruption of chest compressions, at any time for any reason, should last no more than 10 seconds
j) 10-second interruptions should coincide with two-minute cycles of chest compressions
k) **On-scene resuscitation:** patients who are found in arrest or who arrest prior to transport and are **attended to by ALS clinicians must remain in place** (with minimal movement, no attempts at patient loading, and no attempts at transport) until the following have been accomplished:
   (1) **Medical Etiologies**
      (a) The patient has received three doses of epinephrine, regardless of algorithm being followed
   (2) **Trauma Etiologies**
      (a) Penetrating trauma patients should receive the indicated reversible causes treatments listed in section BBB–Trauma Protocol: Trauma Arrest, lines a) through h) of Treatment, while loading and preparing for immediate transport
      (b) Blunt trauma patients should receive all indicated reversible causes treatments listed in section BBB–Trauma Protocol: Trauma Arrest, lines a) through h) of Treatment, while on scene before termination of resuscitation or transport if ROSC is achieved.
   (3) **Exemptions** from on-scene resuscitation:
      (a) Where physical barriers prevent resuscitation
      (b) Where clinicians are in danger
      (c) Pregnant patients
      (d) Patients in cardiac arrest thought to be secondary to hypothermia or submersion
l) **Following the initial on-scene resuscitation above,** clinicians may choose to continue the on-scene resuscitation until termination of resuscitation or to transport the patient at any time. Clinicians should ensure the following prior to transport:
   (1) Mechanical CPR (mCPR) in place (if available)
   (2) Placement of an airway that facilitates ventilation during transport by a restrained clinician
m) Identify rhythm and treat according to appropriate algorithm.
n) When the patient's condition changes, indicating the transition to a new treatment algorithm, the new treatment shall take into account prior therapy (e.g., previously administered medications).
o) If ROSC, refer to ROSC Protocol.
p) Consider Termination of Resuscitation when appropriate.

I. CARDIAC EMERGENCIES: CARDIAC ARREST (Continued)

For patients who have not reached their 18th birthday:

q) Identify rhythm and treat according to appropriate algorithm.

r) Only in a pediatric or neonatal arrest situation, naloxone, atropine, and epinephrine, can be administered via the ET route. Medications administered for pediatric patients via the endotracheal tube route shall be 2–2.5 times the IV dose for naloxone and atropine, and ten times the IV dose for epinephrine (1:1,000). All ET medications shall be diluted in 5 mL of LR for pediatric patients.

s) If no ROSC, transport to the closest appropriate facility.

t) If ROSC, perform 12-lead EKG and transport the patient to Children's National Medical Center or Johns Hopkins Children's Center by ground or medevac. If arrival time is greater than 30 minutes to either of these destinations, transport to the closest appropriate facility.

4. ADULT ASYSTOLE ALGORITHM

- Continue CPR
- Assure adequate ventilation
- Establish IV access with LR
- Confirm asystole in more than one lead

Epinephrine (1:10,000) 1 mg IV/IO push every 4 minutes up to a max of 4 doses for the initial arrest. If arrest occurs after ROSC, an additional 2 doses may be administered. **(NEW '20)**

Consider Possible Causes

Consider possible causes of asystole.
(Parenthesis) = Possible Therapies and Treatments

Hypovolemia	(Volume Infusion) (c)
Cardiac Tamponade	(Volume Infusion) (c)
Tension Pneumothorax	(Needle Decompression Thorocostomy–NDT)
Massive Pulmonary Embolism	
Massive AMI	
Drug Overdose	(a,b)
Hypoxia	(Ventilation)
Hypothermia	(Warming)
Acidosis	(a)
Hyperkalemia	(a,b)

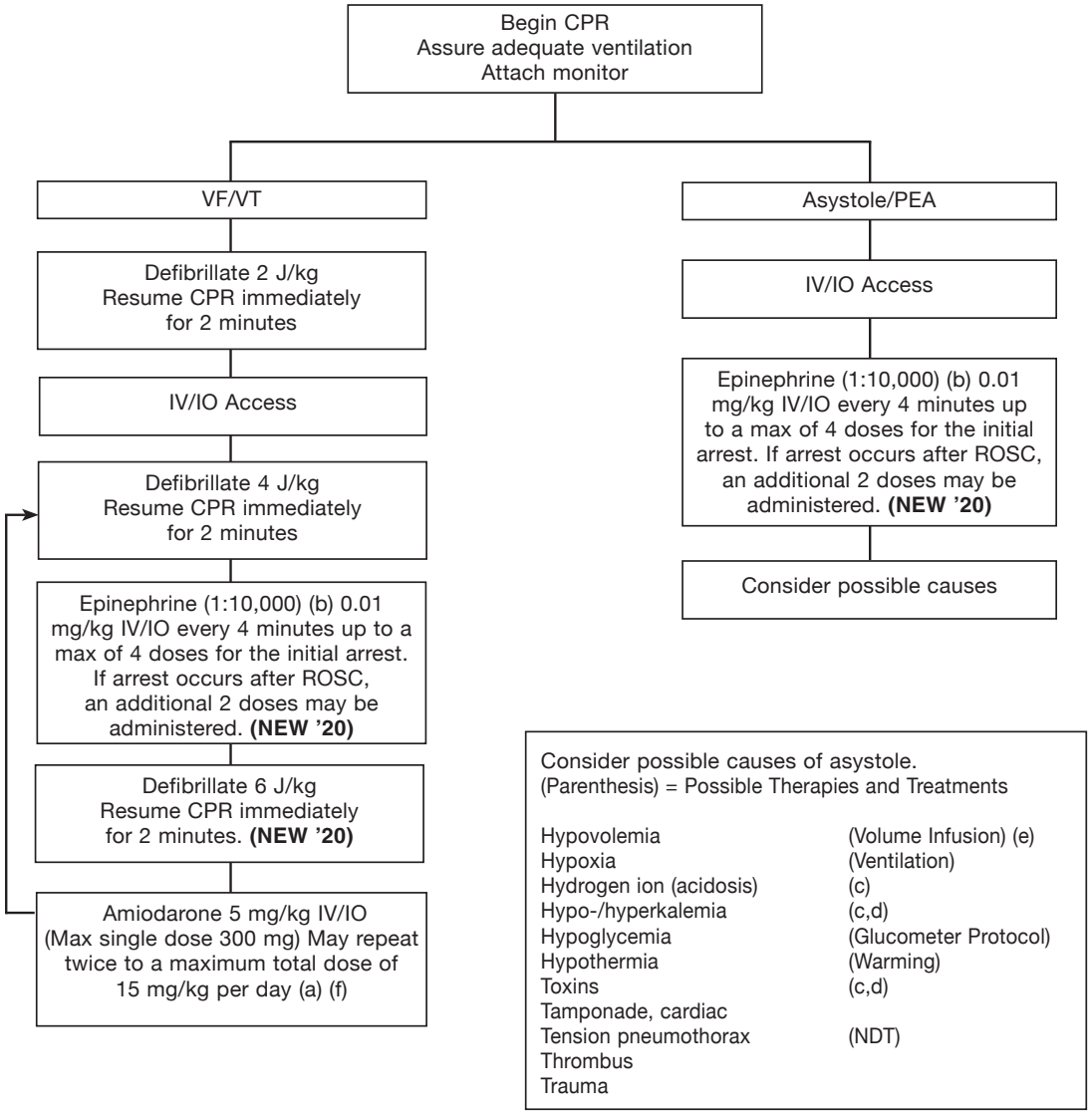
(a) - Sodium bicarbonate 1 mEq/kg, with medical consultation. See sodium bicarbonate.

(b) - Calcium chloride, 0.5–1 gram IVP. See calcium chloride.

(c) - Volume infusion is 20 mL/kg.

5.

PEDIATRIC CARDIAC ARREST ALGORITHM
(If less than 1 hour old, refer to the Newly Born Protocol)



(a) - Continue cycle of epinephrine, defibrillation at 8 J/kg then 10 J/kg. **(NEW '20)**

(b) - Neonates (0–28 days), epinephrine ET 0.03 mg/kg (1:10,000) dilute with 1 mL.

(c) - Sodium bicarbonate, 1 mEq/kg, with medical consultation. See sodium bicarbonate.

(d) - Calcium chloride, 20 mg/kg (0.2 mL/kg) SLOW IVP/IO (50 mg/min). Max dose 1 gram.

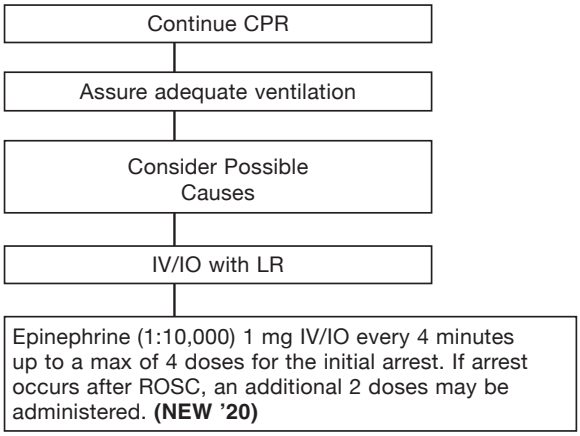
(e) - Volume infusion for neonates and volume-sensitive children, 10 mL/kg; for infant and child 20 mL/kg.

(f) - If torsades de pointes, administer magnesium sulfate (25 mg/kg IV/IO to a maximum of 2 grams over 2 minutes before amiodarone).

6. ADULT PULSELESS ELECTRICAL ACTIVITY (PEA) ALGORITHM

Includes:

- EMD
- Pseudo EMD
- Brady-asystolic Rhythms
- Idioventricular Rhythms
- Ventricular Escape Rhythms
- Post-defibrillation Idioventricular Rhythms



Consider possible causes of PEA.
(Parenthesis) = Possible Therapies and Treatments

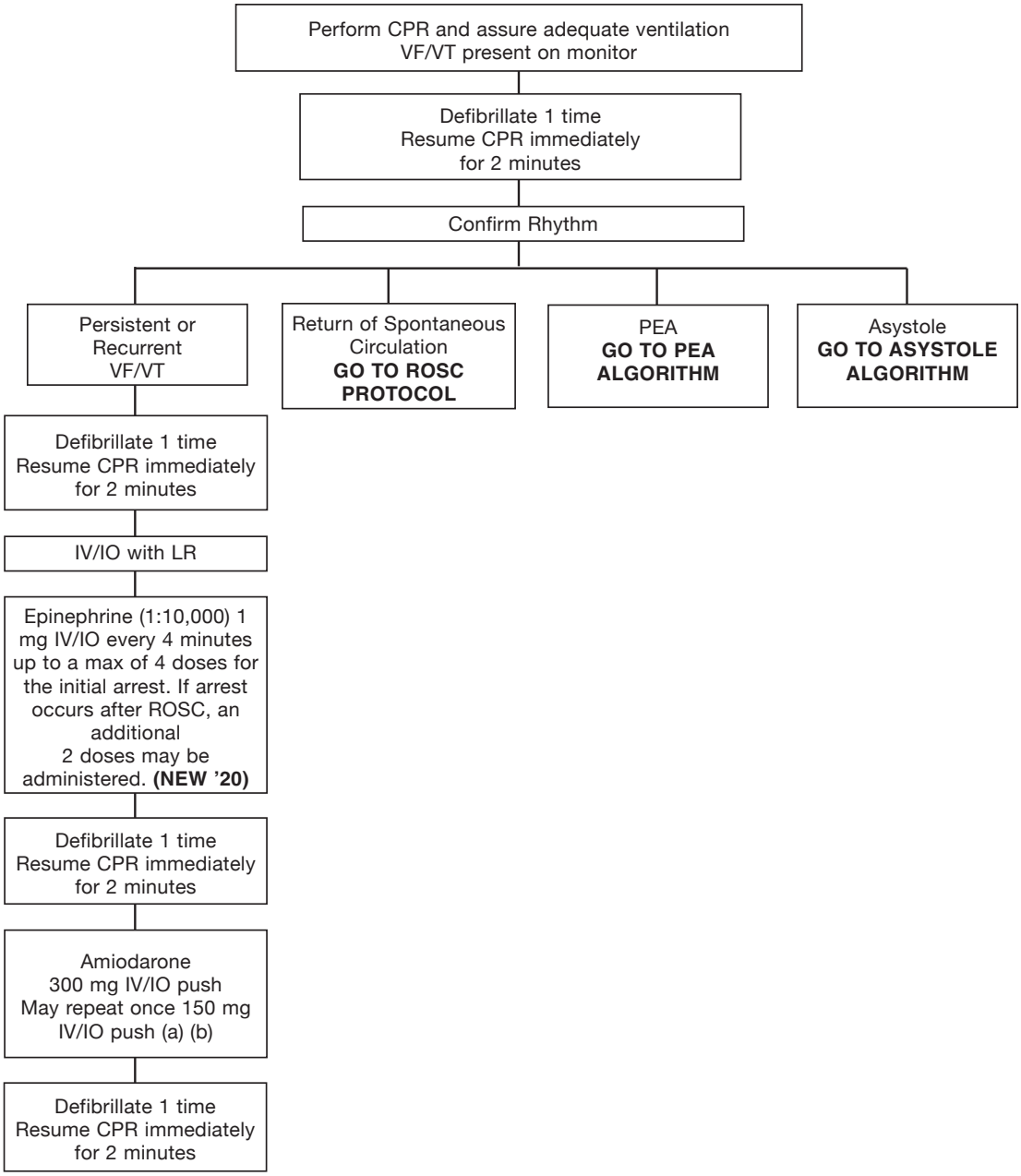
Hypovolemia	(Volume Infusion) (c)
Cardiac Tamponade	(Volume Infusion) (c)
Tension Pneumothorax	(Needle Decompression Thorocostomy–NDT)
Massive Pulmonary Embolism	
Massive AMI	
Drug Overdose	(a,b)
Hypoxia	(Ventilation)
Hypothermia	(Warming)
Acidosis	(a)
Hyperkalemia	(a,b)

(a) - Sodium bicarbonate 1 mEq/kg, with medical consultation. See sodium bicarbonate.

(b) - Calcium chloride, 0.5–1 gram IVP. See calcium chloride.

(c) - Volume infusion is 20 mL/kg.

7. VENTRICULAR FIBRILLATION PULSELESS VENTRICULAR TACHYCARDIA



(a) - Sodium bicarbonate 1 mEq/kg, with medical consultation. See sodium bicarbonate.

(b) - If torsades de pointes is present, give magnesium sulfate 1–2 grams IV/IO over 2 minutes before amiodarone.

J. RETURN OF SPONTANEOUS CIRCULATION (ROSC)

1. Inclusion Criteria
   Patients revived from non-traumatic cardiac arrest.

2. Treatment
   a) Verify presence of carotid pulse. If absent, go to Cardiac Arrest Protocol.

ALERT FREQUENTLY REASSESS FOR PRESENCE OF PULSE. IF ANY DOUBT AS TO PRESENCE OF PULSE, REINITIATE CHEST COMPRESSIONS AND RETURN TO APPROPRIATE ALGORITHM FOR CARDIAC ARREST.

   b) If apneic or inadequate respirations, continue to support ventilations. Use supplemental oxygen in accordance with General Patient Care (Breathing in Initial Assessment, page 28).
   c) Reassess vital signs. Treat any abnormalities in accordance with relevant algorithms.
   d) If patient is 18 years of age or older and comatose (GCS less than 8), initiate Neuroprotective Induced Hypothermia Protocol (Medical etiology arrest only).
   e) Rendezvous with ALS or transport to nearest ED.

---

   f) If available and not already in place, apply mechanical CPR (mCPR) device in standby mode.
   g) Identify rhythm and treat according to appropriate algorithm.
   h) Obtain 12-lead EKG; if STEMI, treat according to STEMI protocol.
   i) Establish IV/IO access, if not yet obtained.
   j) Treat hypotension
      (1) If lungs are clear, consider fluid bolus. 20 mL/kg LR IV. Titrate to SBP of 90 mmHg.
      (2) Consider epinephrine infusion for hypotension that does not improve with fluid bolus (medical etiology arrests only)
         (a) Add 1 mg of epinephrine (either 1:1,000 or 1:10,000) in a 100 mL bag of LR or NS
         (b) Use a Microdrip set (60 drops/mL) for infusion administration
         (c) Adult epinephrine infusion dosage:
            (i) Administer infusion through a free-flowing IV, ideally 20 gauge or larger, or by IO
            (ii) Start infusion at 1 mL/min (60 drops/min) IV/IO
            (iii) Check blood pressure every 5 minutes. If MAP is less than 65 mmHg or systolic blood pressure is less than 90 mmHg, increase to a maximum rate of 2 mL/min (120 drops/min).
            (iv) If above blood pressure goals are not met upon reaching maximum rate, obtain online medical consultation.
      (3) Reassess need for intubation if not yet performed.
      (4) Identify and treat contributing causes.

J. RETURN OF SPONTANEOUS CIRCULATION (ROSC)

1. Inclusion Criteria
   Patients revived from non-traumatic cardiac arrest.

2. Treatment
   a) Verify presence of carotid pulse. If absent, go to Cardiac Arrest Protocol.

ALERT FREQUENTLY REASSESS FOR PRESENCE OF PULSE. IF ANY DOUBT AS TO PRESENCE OF PULSE, REINITIATE CHEST COMPRESSIONS AND RETURN TO APPROPRIATE ALGORITHM FOR CARDIAC ARREST.

   b) If apneic or inadequate respirations, continue to support ventilations. Use supplemental oxygen in accordance with General Patient Care (Breathing in Initial Assessment, page 28).
   c) Reassess vital signs. Treat any abnormalities in accordance with relevant algorithms.
   d) If patient is 18 years of age or older and comatose (GCS less than 8), initiate Neuroprotective Induced Hypothermia Protocol (Medical etiology arrest only).
   e) Rendezvous with ALS or transport to nearest ED.

---

   f) If available and not already in place, apply mechanical CPR (mCPR) device in standby mode.
   g) Identify rhythm and treat according to appropriate algorithm.
   h) Obtain 12-lead EKG; if STEMI, treat according to STEMI protocol.
   i) Establish IV/IO access, if not yet obtained.
   j) Treat hypotension
      (1) If lungs are clear, consider fluid bolus. 20 mL/kg LR IV. Titrate to SBP of 90 mmHg.
      (2) Consider epinephrine infusion for hypotension that does not improve with fluid bolus (medical etiology arrests only)
         (a) Add 1 mg of epinephrine (either 1:1,000 or 1:10,000) in a 100 mL bag of LR or NS
         (b) Use a Microdrip set (60 drops/mL) for infusion administration
         (c) Adult epinephrine infusion dosage:
            (i) Administer infusion through a free-flowing IV, ideally 20 gauge or larger, or by IO
            (ii) Start infusion at 1 mL/min (60 drops/min) IV/IO
            (iii) Check blood pressure every 5 minutes. If MAP is less than 65 mmHg or systolic blood pressure is less than 90 mmHg, increase to a maximum rate of 2 mL/min (120 drops/min).
            (iv) If above blood pressure goals are not met upon reaching maximum rate, obtain online medical consultation.
      (3) Reassess need for intubation if not yet performed.
      (4) Identify and treat contributing causes.

J. RETURN OF SPONTANEOUS CIRCULATION (ROSC) (continued)

k) If VF or VT was present during arrest and amiodarone not yet given, consider amiodarone 150 mg IV/IO over ten minutes. (Presence of a perfusing sinus rhythm is necessary for the administration of amiodarone for the ROSC patient post VF/VT conversion.)

l) Initiate transport to appropriate facility.

m) Arrests due to **medical** etiology:

(1) Most patients should go to a Cardiac Interventional Center. Consider helicopter transport.

(2) Transport to nearest ED.

(a) If obvious non-cardiac cause for arrest (e.g., drowning, asphyxiation, opiate overdose). (If cause for arrest is in any way uncertain, patient must be transported to Cardiac Interventional Center, except as under b and c below.)

OR

(b) If transport time to Cardiac Interventional Center is more than 45 minutes greater than transport time to nearest ED

OR

(c)  If patient's clinical instability will not allow for safe transport to Cardiac Interventional Center due to transport time.

n) Arrests due to **trauma** etiology:

(1) Transport to closest appropriate trauma center.

o) Treat hypotension

(1) If lungs are clear, consider fluid bolus 20 mK/kg LR IV. Titrate to blood pressure goals in (3) below.

(2)  For persistent hypotension that does not improve with fluid bolus, the following pediatric epinephrine infusion dosage chart should be used for pediatric patients less than 50 kg (using approved epinephrine infusion and 60 drop set):

Weight range (kg)	Initial epinephrine dose	If goal blood pressure not achieved at 5 min, increase to
LESS than 10 kg	6 drops/min (0.1 mL/min)	12 drops/min (0.2 mL/min)
10-19 kg	12 drops/min (0.2 mL/min)	24 drops/min (0.4 mL/min)
20-29 kg	18 drops/min (0.3 mL/min)	36 drops/min (0.6 mL/min)
30-39 kg	24 drops/min (0.4 mL/min)	48 drops/min (0.8 mL/min)
40-49 kg	30 drops/min (0.5 mL/min)	60 drops/min (1.0 mL/min)

J. RETURN OF SPONTANEOUS CIRCULATION (ROSC) (continued)

(3) Blood pressure goal:
  (a) For patients 10 years and older (including adults), systolic blood pressure greater than 90 mmHg;
  (b) For patients under 10 years of age, systolic blood pressure greater than 70 + 2x age in years mmHg; OR
  (c) Systolic blood pressure ordered by the pediatric base station.

(4)  If above blood pressure goal not met after 10 minutes, obtain online medical consultation.

p) Arrests due to **medical** etiology:
  (1) Except as under (2) below, most pediatric patients should be transported to Children's National Medical Center or Johns Hopkins Children's Center. Consider helicopter transport.
  (2) Transport to nearest ED.
    (a) If transport time to Children's National Medical Center or Johns Hopkins Children's Center is more than 30 minutes greater than transport time to nearest ED,
    OR
    (b) With medical consultation, if patient's clinical instability will not allow for safe transport to one of the above centers due to transport time.

q) Arrests due to **trauma** etiology:
  (1) Transport to closest appropriate pediatric trauma center.

ALL POST-CARDIAC ARREST PATIENTS ARE PRIORITY 1, AND REQUIRE MEDICAL CONSULTATION. PEDIATRIC PATIENTS REQUIRE CONSULTATION WITH A PEDIATRIC BASE STATION, WHICH MAY ASSIST IN DESTINATION DETERMINATION.

K. TERMINATION OF RESUSCITATION (Medical and Traumatic)

1. Inclusion Criteria
   Patients who are in cardiac arrest.

2. Contraindications
   a) If arrest is believed to be secondary to hypothermia or submersion, treat according to appropriate protocol and transport to the nearest appropriate facility.
   b) If patient is pregnant, treat according to appropriate protocol and transport to the nearest appropriate facility.

3. Procedure
   a) For resuscitation started prior to EMS arrival (traumatic or non-traumatic etiology):
      (1) EMS clinicians should terminate resuscitation if the patient meets the criteria listed in the Pronouncement of Death in the Field Protocol (section 2. Indications (a. – f.))

   b) BLS clinicians may terminate resuscitation for adult patients (age 18 or older) if:
      (1) ALS resources are genuinely unavailable, **and**
      (2) The patient has received a minimum of 15 two-minute cycles of HPCPR, **and**
      (3) During the five AED analyses immediately prior to TOR there was "no shock advised".

   c) Cardiac arrest (medical etiology)
      (1) ALS clinicians may terminate resuscitation for:
         (a) An adult patient (age 18 or older) after the patient has received 15 two-minute cycles of HPCPR, and the patient is:
            (i) in asystole, OR
            (ii) in VF, pulseless VT, or PEA with an $ETCO_2$ of less than 15 mmHg
         (b) If patient does not meet TOR criteria, continue resuscitation and reevaluate at the next rhythm check

   d) Cardiac arrest (traumatic etiology) **(NEW '20)**
      (1) For adult patient (age 15 years or older) ALS clinicians may terminate resuscitation regardless of total resuscitation time if:
         (a) The patient presents in asystole OR
         (b) The patient's cardiac rhythm changes to asystole during the resuscitation
         (c) ALS clinicians may terminate resuscitation following 5 two-minute cycles of HPCPR according to the Trauma Protocol: Trauma Arrest Protocol for a patient who remains in PEA or VF

ASYSTOLE AND RESUSCITATIONS LASTING LONGER THAN 10 MINUTES ARE INDEPENDENT PREDICTORS OF MORTALITY IN THE TRAUMA PATIENT. TREATMENT OF THE TRAUMA ARREST PATIENT SHOULD FOCUS ON IDENTIFYING AND TREATING REVERSIBLE CAUSES DURING THAT NARROW RESUSCITATIVE WINDOW. TOR AND TRANSPORT DECISIONS SHOULD ONLY BE MADE AFTER ADMINISTERING TIME-SENSITIVE AND APPROPRIATE THERAPIES.

K. TERMINATION OF RESUSCITATION (Medical and Traumatic) (Continued)

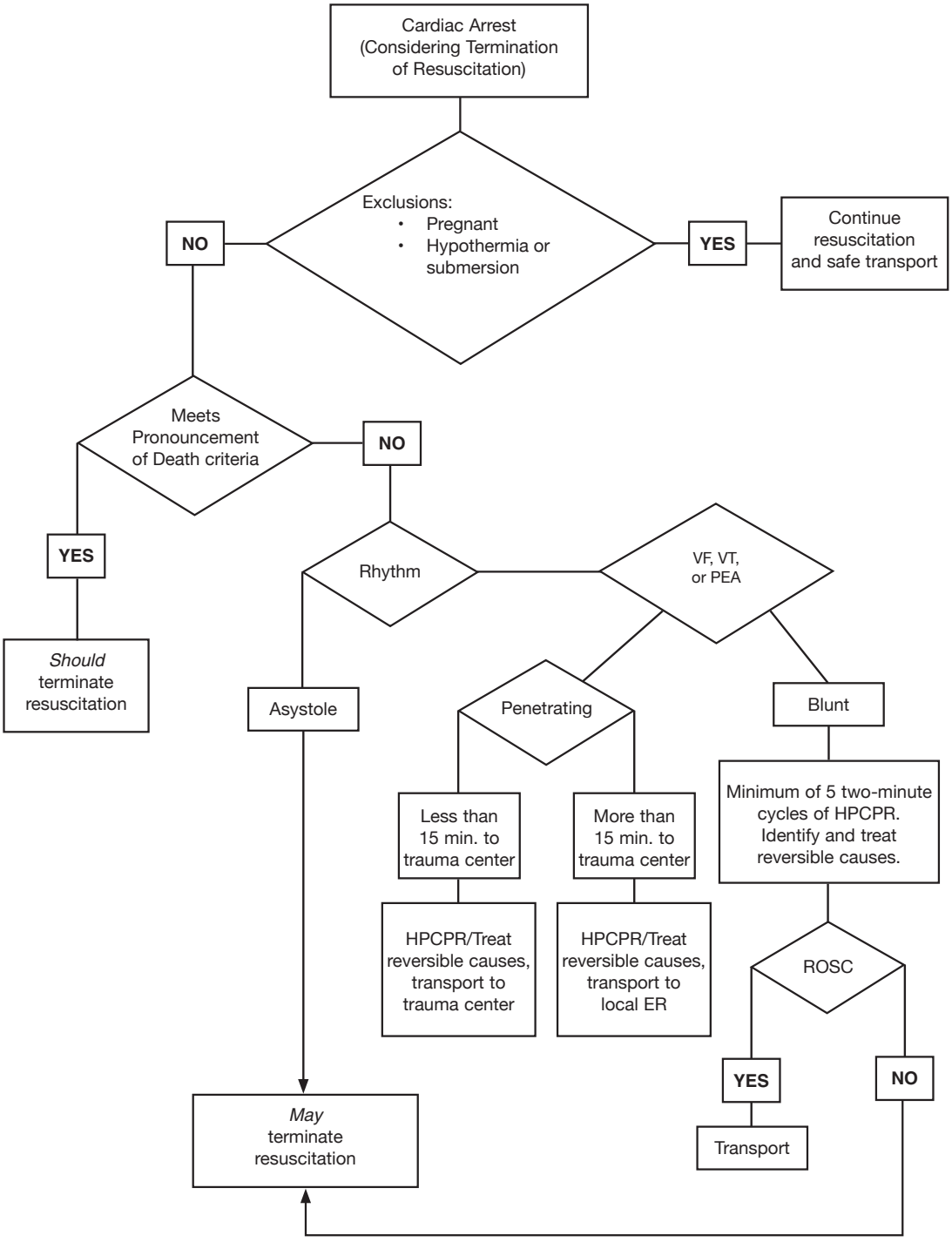
(NEW '20)
BLS clinicians may **not** terminate resuscitation for pediatric **medical** arrest patients.

BLS clinicians **may** terminate resuscitation for pediatric **traumatic** arrest patients (under age 15) if:
(1) ALS resources are genuinely unavailable, **and**
(2) The patient has received a minimum of 15 two-minute cycles of HPCPR, **and**
(3) During the five AED analyses immediately prior to TOR there was "no shock advised".

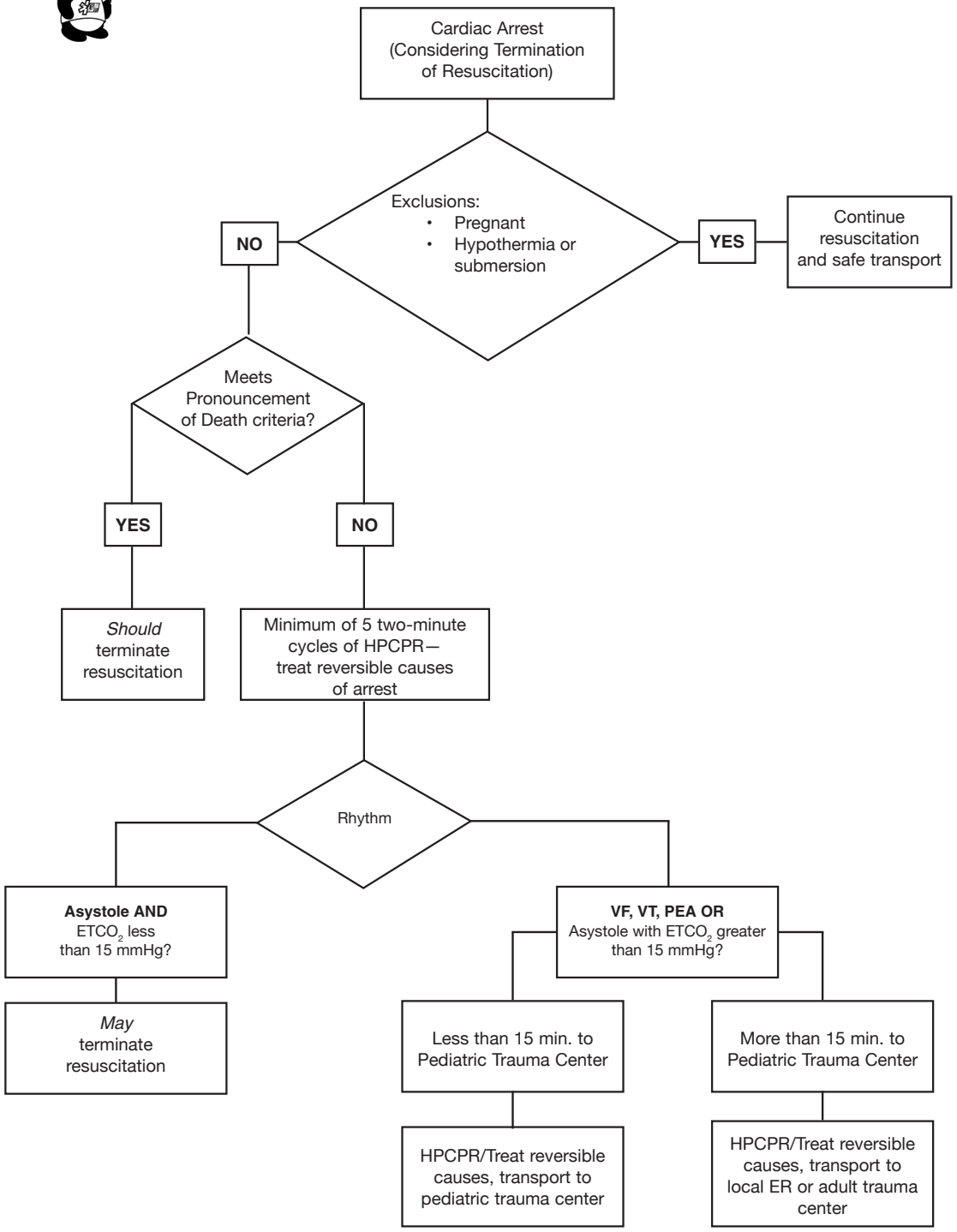
(NEW '20)

e) Cardiac arrest (medical etiology)
   (1) ALS clinicians may terminate resuscitation for:
      (a) A pediatric patient (has not yet reached the 18th birthday) after the patient has received 15 two-minute cycles of HPCPR, and at least 1 dose of epinephrine and the patient is:
         (i) in asystole, AND
         (ii) has a sustained $ETCO_2$ of less than 15 mmHg, AND
         (iii) in the judgment of EMS and law enforcement on scene, there is adequate social/emotional support and safety for civilians and professionals on scene, AND
         (iv) in the judgment of EMS and law enforcement, scene is amenable to leaving patient on scene.
      (b) If patient does not meet TOR criteria, continue resuscitation and reevaluate at the next rhythm check
f) Cardiac arrest (traumatic etiology)
   (1) ALS clinicians may terminate resuscitation for:
      (a) A pediatric patient (has not yet reached their 15th birthday) after the patient has received 5 two-minute cycles of HPCPR according to the Trauma Protocol: Trauma Arrest Protocol if:
         (i) patient has received 5 two-minute cycles of HPCPR without ROSC **AND**
         (ii) asystole on monitor and $ETCO_2$ is less than 15 mmHg, AND
         (iii) In the judgment of EMS and law enforcement on scene, there is adequate social/emotional support and safety for civilians and professionals on scene, AND
         (iv) In the judgment of EMS and law enforcement, scene is amenable to leaving patient on scene.
g) Pronouncement of Death in the Field Protocol.

ADULT TERMINATION OF RESUSCITATION (NEW '20)
TRAUMA ARREST
(Age 15 years and older)



PEDIATRIC TERMINATION OF RESUSCITATION ALGORITHM (NEW '20)
TRAUMA ARREST
(Patients Who Have Not Yet Reached Their 15th Birthday)



Edition Date August 1, 2020
Release Date June 10, 2020

L. PRONOUNCEMENT OF DEATH IN THE FIELD

1. Purpose
   This protocol is designed to guide the EMS clinician in pronouncing death in the field.

   Health General Article §5-202 provides that:

   a) An individual is dead if, based on ordinary standards of medical practice, the individual has sustained either:
      (1) Irreversible cessation of circulatory and respiratory functions; or
      (2) Irreversible cessation of all functions of the entire brain, including the brain stem.

2. Indications
   EMS clinicians may pronounce the death of a patient when one or more of the following criteria has been met.
   a) Decapitation
   b) Rigor mortis
   c) Decomposition
   d) Dependent lividity
   e)  Pulseless, apneic patient in a multi-casualty incident where system resources are required for the stabilization of living patients
   f)  Pulseless, apneic patient with an injury not compatible with life (with the exception of an obviously pregnant female where resuscitation attempts should be initiated and the patient transported to the nearest appropriate facility)
   g) The EMS clinician has terminated resuscitation per the Termination of Resuscitation Protocol.

3. Procedure
   a) Confirm that the patient is unresponsive, pulseless, and apneic.
   b) The patient who meets criteria in 2.e may be “black” tagged during triage (by a BLS or ALS clinician), but asystole must be confirmed by ALS clinician before a formal pronouncement of death.
   c) The patient who meets criteria in 2.f must be confirmed to be in asystole by ALS clinician before a formal pronouncement of death. If the condition of the remains precludes obtaining a cardiac rhythm to confirm asystole (e.g., incineration, severe disruption of the torso, etc.), this must be documented on the patient care report.
   d) Document the exact time and location of the pronouncement of death.
   e) Notify law enforcement and follow local jurisdictional policies. If deceased patient is a tissue/organ donor and law enforcement has released the body to the family, please assist the family in calling either 800-923-1133 or (for Charles, Montgomery and Prince George’s counties) 703-641-0100. If death is pronounced during transport, deliver patient to the hospital and follow hospital policies.

M. EMS DNR/MOLST

AS OF JANUARY 1, 2002, A COPY OF THE MARYLAND EMS DNR ORDER FORM CAN BE ACCEPTED IN LIEU OF THE ORIGINAL.

AS OF OCTOBER 1, 2011, THE MARYLAND MOLST FORM CAN BE ACCEPTED IN LIEU OF THE MARYLAND EMS/DNR FORM.

1. PREFACE EMS/DNR Order or MOLST forms, bracelets, and necklaces will recognize three patient options for care prior to arrest:
   a) **Option A (ALS) (MOLST A1)**—Maximal (Restorative) Care (with intubation) Before Arrest, then DNR
   b) **Option A (DNI) (MOLST A2)**—Comprehensive Efforts to Prevent Arrest But Do Not Intubate, then DNR
   c) **Option B (BLS) (MOLST B)**—Limited (Palliative) Care Only Before Arrest, then DNR

2. VALID EMS/DNR or MOLST BRACELET WITH INSERT or AUTHORIZED METAL EMBLEM HAS THE SAME EFFECT AS THE FORM.
   a) Typically only one EMS/DNR device is needed to initiate the EMS/DNR Protocol.
   b) EMS clinicians should only request a second instrument (e.g., a bracelet when a form has already been presented) if there is reason to question the validity of the first produced notification device.

3. RECIPROCITY
   a) A standardized EMS/DNR Order from another state may be honored.
   b) Out-of-state EMS/DNR Orders shall be followed to the full extent that is permissible by the Maryland Medical Protocols for Emergency Medical Services Clinicians. If there is misunderstanding with family members or others present at the scene or if there are other concerns about following the out-of-state EMS/DNR Order, contact online medical direction for assistance.

4. ORAL EMS/DNR ORDERS
   a) EMS clinicians may follow an oral EMS/DNR Order directly from a Maryland-licensed physician (MD or DO), physician assistant, or nurse practitioner who is physically present "on-site." EMS shall not accept orders from private physician attendings, physician assistant, or nurse practitioner by telephone.
   b) **EMS clinicians may follow an oral EMS/DNR Order from a Maryland-licensed physician "on-line" via the EMS Communications System (e.g., radio or telephone consult that is routed through a public service access point (PSAP) for audio recording).**

5. ACCEPTABLE AND UNACCEPTABLE EMS/DNR ORDERS
   a) The following are acceptable for implementing the EMS/DNR Protocol:
      (1) Original Maryland EMS/DNR Order Form
      (2) Copy of the Maryland EMS/DNR Order Form (including an electronic copy on a computer or device for patient care decisions. The sending facility is required to provide a copy of the EMS/DNR Order or MOLST to the transport crew (listed in the instructions of the MOLST form and COMAR 10.01.21.03)).

M. EMS DNR/MOLST (Continued)

(3) Other State EMS/DNR Order Form
(4) Maryland EMS/DNR Bracelet Insert
(5) Medic Alert DNR Bracelet or Necklace
(6) Oral DNR Order from EMS System Medical Consultation
(7) Oral DNR Order from other on-site physician, physician assistant, or nurse practitioner
(8) Maryland MOLST Form
(9) Maryland MOLST Bracelet

b) The following **are not** acceptable for implementing the EMS/DNR Protocol:
(1) Advance directives without an EMS/DNR Order
(2) Facility-specific DNR orders
(3) Notes in medical records
(4) Prescription pad orders
(5) DNR stickers
(6) An oral request from someone other than a physician, physician assistant, or nurse practitioner
(7) An oral order from an attending physician, physician assistant, or nurse practitioner who is not on site
(8) Any other device or instrument not listed above as acceptable

6. VALIDITY OF EARLIER VERSIONS OF EMS/DNR ORDERS
a) Older versions of EMS/DNR Orders — i.e., initial version (1995 and first revision, 4/1/96) — **continue to be valid and need not be updated** unless the patient or authorized decision-maker wishes to take advantage of new features available in the newer forms.
b) EMS clinicians should treat older versions of EMS/DNR order (pre 7/1/98) as "Option B (BLS) - Limited (Palliative) Care Only Before Arrest, Then DNR."

7. REVOCATION OF AN EMS/DNR ORDER
a) An EMS/DNR Order may be revoked at any time by:
(1) Physical cancellation or destruction of all EMS/DNR Order devices; or
(2) An oral statement by the patient made directly to emergency medical services personnel requesting only palliative care or resuscitation. If the patient revokes an EMS/DNR Order orally, the EMS/DNR Order notification devices do not need to be destroyed. EMS clinicians should thoroughly document the circumstances of the revocation. An oral revocation by a patient is only good for the single response or transport for which it was issued.
b) An authorized decision-maker, other than the patient, cannot revoke an EMS/DNR Order orally. Because of the difficulty in identifying authorized decision-makers in emergent situations, it is incumbent upon an authorized decision-maker who has authority to revoke an EMS/DNR Order to either void or withhold all EMS/DNR Order devices if they wish resuscitation for the patient. If there is any confusion, the EMS clinician should contact a Base Station for medical consult.

M. EMS DNR/MOLST (Continued)

c) Section 5-610 of the Health Care Decision Act (Health General Article, Annotated Code of Maryland) makes willful concealment, cancellation, defacement, obliteration, or damage of an advance directive (including EMS/DNR Orders), without the patient's or authorized decision-maker's consent, a misdemeanor subject to a fine not exceeding $10,000, imprisonment not exceeding one year, or both.

8. ANTICIPATED LOCATIONS FOR EMS/DNR ORDER FORMS:
   EMS personnel shall be directed to look for an EMS/DNR Order in the following places:
   a) About a patient's wrist, hung from a necklace, or safety-pinned to a patient's clothing.
   b) At medical facilities, in the patient's chart.
   c) In residences and domicile facilities, by the bedside, behind the patient's bedroom door, or on the refrigerator door.
   d) In schools and educational institutions, in the nurse's office, health room, or with the student's attendant caregiver/aide.
   e) Family or caregivers will be expected to retrieve the original EMS/DNR Order prior to the ambulance's arrival.

9. IDENTIFICATION OF PATIENT
   a) If the patient is able, the patient can self-identify during the initial assessment.
   b) If the patient is unable to communicate, then family, caregivers, or bystanders can identify the patient for EMS clinicians.
   c) If an EMS/DNR vinyl bracelet with insert or metal emblem (bracelet or necklace) is attached to a patient (on wrist, pendant from neck, pinned to clothing, etc.) the patient's identity can be reasonably assumed by EMS clinicians.
   d) If an EMS/DNR vinyl bracelet insert or metal emblem (bracelet or necklace) is found detached from the patient, EMS personnel must treat it as an EMS/DNR Order form and identify the subject of the EMS/DNR Order as the patient. A valid bracelet insert alone, without the vinyl bracelet, is a valid EMS/DNR Order so long as EMS clinicians confirm the patient's identity.
   e) If EMS personnel are unable to ascertain with reasonable certainty, when required to do so, that the subject of the EMS/DNR Order is the patient, they may resuscitate the patient.

10. HEALTH Clinician/EMS PERSONNEL IMMUNITY
    a) General immunity provisions, such as Good Samaritan immunity for volunteers and sovereign immunity for government employees, may apply under specific circumstances.

M. EMS DNR/MOLST (Continued)

b) In addition to other immunity that may be provided for in law, the Health Care Decisions Act provides the following specific immunity in cases involving the provision, withdrawal, or withholding of care that may be life-sustaining in nature:
   (1) EMS clinicians are not subject to criminal prosecution or civil liability or deemed to have engaged in unprofessional conduct as determined by the appropriate licensing, registering, or certifying authority as a result of **withholding or withdrawing** any health care **under authorization** obtained in accordance with the Health Care Decisions Act. See HG (5-609(a)(1)).
   (2) EMS clinicians **providing, withholding, or withdrawing** treatment under authorization obtained under the Health Care Decisions Act do not incur liability arising out of any claim to the extent the claim is based on **lack of consent or authorization** for the action.
   See HG (5-609(a)(2)).
   (3) EMS clinicians **providing** treatment because they reasonably believe that an EMS/DNR Order, other than a bracelet, is not valid, do not incur liability arising out of any claim to the extent the claim is based on **lack of consent or authorization** for the action.
   See HG (5-608(d)).

11. EMS/DNR MEDICAL PROTOCOLS
   a) DISPATCH
      (1) Option B EMS/DNR patients (7/98 version) or patients with older version EMS/DNR Orders only require a BLS response. Once the on-scene BLS clinician has determined the need for additional pain control, an ALS Rendezvous may be requested. Medevac requests are not appropriate for these patients.
      (2) Option A or A (DNI) EMS/DNR patients (7/98 version) who are not in arrest may require a range of responses from BLS through the highest echelon of response available. This will depend on the information available to dispatch and the service requested. The response complement in these cases will be dictated by local standard operating procedures (SOP).
      (3) If a dispatch center is unclear whether the DNR order is an EMS/DNR Order or is unclear about the pre-arrest patient care option selected (A, A (DNI), or B), the dispatch center shall dispatch the appropriate resources based on the information available.
      (4) In the absence of knowledge to the contrary, information from medical professionals at a health care facility about the EMS/DNR status of a patient may be presumed to be reliable.

M. EMS DNR/MOLST (Continued)

b) PERFORM LIMITED PATIENT ASSESSMENT
Vital signs:
(1) Check for absence of a palpable pulse.
(2) Check for absence of spontaneous respirations in an unresponsive patient.
(3) Check for a valid EMS/DNR Order or MOLST form; vinyl bracelet insert worn either on the wrist, as a necklace, or pinned to clothing; or for a metal emblem (bracelet or necklace).

c) RESUSCITATE/DO NOT RESUSCITATE CRITERIA
(1) If an EMS/DNR Order is not present, revoked, or otherwise void, the EMS clinician shall treat and, if necessary, transport the patient.
(2) If an EMS/DNR Order is not present, but the EMS clinician believes that resuscitation or further resuscitation is futile, they may initiate the Termination of Resuscitation Protocol.
(3) If a valid EMS/DNR Order is found and the patient is in cardiac or respiratory arrest, no resuscitative measures shall be initiated.
(4) If the patient is conscious and able to communicate that they revoke the EMS/DNR orally directly to EMS clinicians, EMS clinicians shall treat and, if necessary, transport the patient.
(5) If the EMS/DNR patient (Option A, A (DNI), or B) arrests, withhold or withdraw further resuscitation and provide support to the family and caregivers. Consider notifying appropriate personnel.

d) **OPTION A (MOLST A1)** – MAXIMAL (RESTORATIVE) CARE PROTOCOL
(1) When Option A - "Maximal (Restorative) Care (with intubation) Before Arrest, then DNR" is selected on an EMS/DNR Order or MOLST form, the patient shall receive the full scope of restorative interventions permissible under the Maryland EMS Medical Protocols (including Continuous Positive Airway Pressure (CPAP), cardiac monitoring, synchronized cardioversion for pulse-**present** ventricular or supraventricular tachycardia, cardiac pacing for pulse-**present** symptomatic bradycardia, insertion of IVs, and drug therapy), in an attempt to forestall cardiac or respiratory arrest.
(2) This option was requested primarily by long-term care facilities for their patients who are on DNR orders for potentially prolonged periods of time. Many of these patients are less concerned about palliation of pain and more concerned about the quality of life after a stroke or heart attack. The primary medical conditions seen in the field necessitating this option have been the desire to administer dextrose for diabetic emergencies and epinephrine for anaphylactic reactions in patients who, upon arrest, are not to be resuscitated.

M. EMS DNR/MOLST (Continued)

(3) If, despite these efforts, the patient becomes pulseless or stops breathing spontaneously, EMS clinicians shall then withhold or withdraw cardiopulmonary resuscitation (including, but not limited to, CPR, cardiac pacing, defibrillation), withdrawal of active ventilatory assistance upon cardiac arrest, and withholding or withdrawal of drug therapy (e.g., chemical resuscitation).

e) **OPTION A (DNI) (MOLST A2)** – COMPREHENSIVE EFFORTS TO PREVENT ARREST BUT DO NOT INTUBATE, THEN DNR
   (1) Option A (DNI) is exactly the same as Option A, which may include limited ventilatory support by CPAP or BiPAP, but Do Not Intubate.
   (2) Therefore, inappropriate care for "Option A (DNI) – Comprehensive Efforts to Prevent Arrest but Do Not Intubate, then DNR" would be nasal or oral intubation.

IF MAXIMAL CARE IS SELECTED AND THE PATIENT'S CONDITION REQUIRES ALS, AN ALS UNIT SHOULD BE REQUESTED IF FEASIBLE GIVEN THE LOCATION OF THE INCIDENT RELATIVE TO THE NEAREST APPROPRIATE FACILITY, THE AVAILABILITY OF AN ALS UNIT, AND ITS ABILITY TO ARRIVE OR RENDEZVOUS IN A MEDICALLY APPROPRIATE PERIOD OF TIME.

f) **OPTION B (MOLST B)** – PALLIATIVE CARE PROTOCOL
   (1) Supportive Care for Control of Signs and Symptoms
      (a) Respiratory distress
         (i) Open the airway using noninvasive means (e.g., chin lift, jaw thrust, finger sweep, nasopharyngeal airway, oropharyngeal airway, Heimlich maneuver, or laryngoscopy with Magill forceps for suspected airway obstruction, **but no cricothyroidotomy and no tracheostomy**).
         (ii) Administer O2 as follows:
            a. If the patient is not on a ventilator and would benefit from oxygen therapy, provide passive oxygen via nasal cannula or nonrebreather mask (but no positive pressure oxygen via ambu bag, demand valve, or ventilator). If available, pulse oximetry and waveform capnography may be used.
            b. If the patient is found on an outpatient ventilator and is not in cardiac arrest, maintain ventilatory support during transport to the hospital.
            c. If the patient is found on an outpatient ventilator and is in cardiac arrest, contact on-line medical direction to consult about disconnecting the ventilator.
         (iii) Maintain an open airway by noninvasive means (e.g., chin lift, jaw thrust, finger sweep, nasopharyngeal airway, oropharyngeal airway, and Heimlich maneuver or laryngoscopy with Magill forceps for suspected airway obstruction, **but no cricothyroidotomy and no tracheostomy**).
         (iv) Suction as necessary.
         (v) Position for comfort.

M. EMS DNR/MOLST (Continued)

(b) External bleeding
  (i) Standard treatment (direct pressure with dressing, tourniquet)
  (ii) No IVs
(c) Immobilize fractures using skills and devices that minimize pain.
(d) Uncontrolled pain or other symptoms (e.g., severe nausea)
  (i) Allow patient, family, or health care clinicians (other than the prehospital clinician) to administer patient's prescribed medications. Such health care clinicians administering medication will not have to accompany the patient to the hospital. Any medications administered by the patient, family or healthcare clinicians must be documented in the patient care report (PCR).
  (ii) Patient controlled analgesia (PCA) systems for pain medication delivery and other patient-controlled medication (PCM) systems shall be left in place in DNR patients and monitored to the extent possible according to the clinician's level of certification or licensure.
  (iii) For the patient with significant pain and/or pain with a prolonged transport, the pain management protocol may be initiated.
(e) Existing IV lines may be in place and shall be monitored to the extent possible according to the clinician's level of certification and licensure.

(2) Inappropriate Care for a Palliative Care Patient
(a) Cardiac monitoring, including 12-lead EKG, pacing, cardioversion, and defibrillation
(b) Initiation of IV therapy (except for medications listed in the pain management protocol administration for pain control as in 1 (d) (iii))
(c) EMS-initiated medications (except oxygen, and medications listed in the pain management protocol as in 1 (d) (iii))
(d) CPR
(e) Intubation (alternative airway device, endotracheal, nasotracheal, or gastric tube)
(f) Active ventilatory assistance, unless on an outpatient ventilator

g) TRANSPORT
(1) Upon request of the patient, family, or caregivers and in lieu of transport to a hospital-based emergency department, EMS clinicians may transport Option B EMS/DNR patients who require transportation for pain control or symptom management or respite care to a specified inpatient hospice facility.
(2) A current list of those facilities is available from the MIEMSS Program Development Office 410-706-4367 (4DNR). The receiving status of a particular facility can be ascertained from EMRC (24 hours a day) by EMS radio, EMSTEL, or red phone, or by calling 800-492-3805.

M. EMS DNR/MOLST (Continued)

(3) The State EMS Board may authorize additional facilities under 6.2.2 or 6.2.4 (pp. 35-36), if recognized in the future by DHMH in accordance with 42 CFR 418.98 and 42 CFR 418.100. EMS jurisdictions and commercial ambulance services will be notified by MIEMSS of any facilities that become eligible and elect to receive patients by ambulance, become ineligible, or elect to discontinue their participation.

(4) Take a copy of EMS/DNR Order or MOLST form, vinyl bracelet with insert, or metal emblem (bracelet or necklace) to the hospital with the patient. If returning the patient from a previous transport, be sure to request a copy of the EMS/DNR Order form, vinyl bracelet with insert, or metal emblem (bracelet or necklace) from the staff. The sending facility is required to provide a copy of the EMS/DNR Order or MOLST to the transport crew (listed in the instructions of the MOLST form and COMAR 10.01.21.03).

h) COMMUNICATIONS

(1) Consultation requirements for Option A EMS/DNR patients shall be dictated by the Maryland EMS Medical Protocols in accordance with the patient's medical needs. EMS clinicians shall notify the hospital of the patient's EMS/DNR status (i.e., Option A) and the identity of patient's physician or nurse practitioner.

(2) No consultation is required for the Option B EMS/DNR patients. The receiving hospital or inpatient hospice facility should be notified to expect the patient and prepare accordingly. Also make the hospital or inpatient facility aware of the patient's EMS/DNR status (i.e., Option B) and the identity of the patient's physician or nurse practitioner.

(3) If there is misunderstanding with family members or others present at the scene or if there are other concerns about following the EMS/DNR Order and the patient's condition permits, contact the physician or nurse practitioner signing the order, or the patient's hospice program, or on-line medical direction for assistance.

i) DOCUMENTATION

(1) If possible, make or retain a copy of the EMS/DNR Order or MOLST form and attach it to the official copy of the patient care report that is kept by the EMS service. **Having a copy of the EMS/DNR Order or MOLST form can significantly reduce documentation requirements.** Encourage sending facilities to provide you with an additional copy of the EMS/DNR Order or MOLST form with the patient's transfer documents.

M. EMS DNR/MOLST (Continued)

(2) If the EMS/DNR Protocol is initiated:
  (a) Document, in the narrative section:
    (i) Who gave you the EMS/DNR Order or MOLST form (as an applicable person physically providing the written order, name of on-site physician or nurse practitioner, or name of on-line medical direction physician) or
    (ii) Where the EMS/DNR Order or MOLST form was found;
  (b) Document the EMS/DNR Order number, the effective date of the order, the name of the patient, the patient's date of birth, and the name of the physician, nurse practitioner, or physician assistant who signed the order;
  (c) Document the time the EMS/DNR Protocol was initiated;
  (d) Document any care rendered;
  (e) If the patient arrests while under your care, document the time the patient lost spontaneous respirations or palpable pulse, if able to determine, and
  (f) If the patient arrests while under your care, document the chain of custody until the body is out of custody of EMS.

(3) If resuscitation protocols are initiated, document:
  (a) Care rendered as per normal practice;
  (b) The reason the EMS/DNR Protocol was not initiated, if relevant (e.g., unable to find EMS/DNR Order, EMS/DNR is not or does not appear to be valid, patient request);
  (c) If resuscitation was started because there was reasonable doubt as to the validity of an EMS/DNR Order;
    (i) The EMS/DNR Order number, the effective date of the order, the name of the patient, the patient's date of birth, and the name of the physician, nurse practitioner, or physician assistant signing the order; and
    (ii) Who gave you the EMS/DNR Order or where the EMS/DNR Order or MOLST form was found.

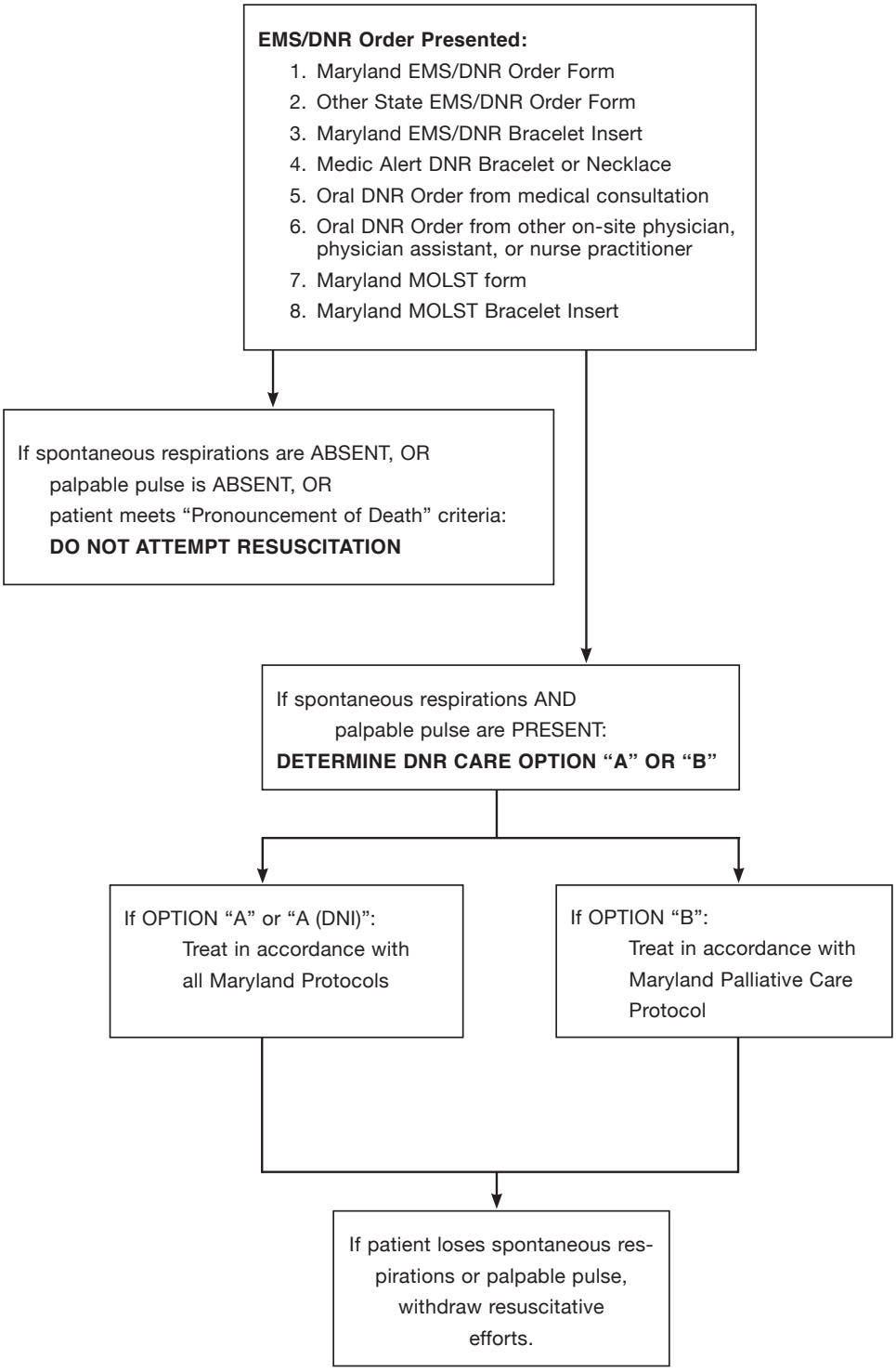
(4) Transfer any EMS/DNR Order or MOLST form to the appropriate authorities (e.g., to hospital or in-patient hospice personnel of the facility where the patient was transferred or, if the patient is deceased, to the physician/police/medical examiner). If possible at the receiving facility, and if not already done, make a copy of the EMS/DNR Order or MOLST form. **DO NOT RETAIN** an original EMS/DNR Order or MOLST form.

M. EMS DNR/MOLST (Continued)

(5) If a copy of the EMS/DNR Order or MOLST form is available to EMS clinicians, it should be attached to the official copy of the patient care report that is retained by the EMS service.
(6) A vinyl bracelet with insert or metal emblem (bracelet or necklace) shall be left where found on the patient. Bracelets or metal emblems shall not be removed without the permission of the patient or the patient's authorized decision-maker and, when possible, shall be returned with the patient to the sending facility.

j) PATIENT DISPOSITION IF NOT TRANSPORTED
If the EMS/DNR Protocol is implemented and the patient is not transported because the patient arrested at the response site, EMS personnel shall:
(1) Follow local operational procedures for handling deceased patients.
(2) Do **not** remove an EMS/DNR vinyl bracelet or metal emblem (bracelet or necklace) from the deceased patient.
(3) Law enforcement personnel or a representative of the medical examiner's office needs to be notified only in the case of sudden or unanticipated death that occurs:
(a) By violence
(b) By suicide
(c) As a result of an accident
(d) Suddenly, if the deceased was in apparent good health, or
(e) In any suspicious or unusual manner.

N. EMS DNR Flowchart



O. CARDIAC EMERGENCIES: ACUTE CORONARY SYNDROME (SUSPECTED)

1. Inclusion Criteria
   Acute Coronary Syndrome (ACS) is defined as patients presenting with angina or anginal equivalents such as shortness of breath; chest, epigastric, arm, or jaw pain or discomfort; unexplained diaphoresis; and/or nausea.

2. Treatment

   a) Place patient in position of comfort.

   b) Administer aspirin 324 mg or 325 mg chewed, if not given prior to EMS arrival. **(NEW '20)**

   c) Assist patient with administration of patient's own prescribed nitroglycerin. May be repeated in 3-5 minutes if chest pain persists, blood pressure is greater than 90 mmHg, and pulse is greater than 60 bpm. Maximum 3 doses total (patient- and EMT-assisted).

   d) Assess and treat for shock if indicated.

   e) Continuously monitor airway and reassess vital signs every 5 minutes.

ALERT NITROGLYCERIN IS CONTRAINDICATED FOR ANY PATIENT HAVING TAKEN MEDICATION FOR PULMONARY ARTERY HYPERTENSION (E.G., ADCIRCA™ OR REVATIO™) OR ERECTILE DYSFUNCTION (E.G., VIAGRA™, LEVITRA™, OR CIALIS™) WITHIN THE PAST 48 HOURS. MEDICAL CONSULTATION IS REQUIRED TO OVERRIDE THIS CONTRAINDICATION.

IF THE PATIENT'S BLOOD PRESSURE DROPS MORE THAN 20 mmHg AFTER ADMINISTRATION OF NITROGLYCERIN, OBTAIN MEDICAL CONSULTATION BEFORE FURTHER ADMINISTRATION.

   f) Additional doses of nitroglycerin require medical consultation.

   g) Obtain a 12-lead EKG; this should occur within 10 minutes of contact with an EKG-capable clinician. Document the patient's last name, first initial, age, and gender on the EKG. These identifiers should be on the transmission copy (if able to transmit) and shall be on the delivered printed copy. **(NEW '20)**

   h) Establish IV Access with LR.

O. CARDIAC EMERGENCIES: ACUTE CORONARY SYNDROME (SUSPECTED) (Continued)

i) If patient has a prescription or previous history of nitroglycerin use, administer nitroglycerin: 0.4 mg SL. May be repeated if symptoms persist, and blood pressure is greater than 90 mmHg and pulse is greater than 60 bpm, to a maximum dose of 1.2 mg.

j) If patient does **not** have a prescription or previous history of nitroglycerin use, an IV must be established prior to administration; then administer nitroglycerin as above.

k)  If IV cannot be established, nitroglycerin may be administered with medical consultation.

l) Identify rhythm and treat according to appropriate algorithm.

m)  Administer additional doses of nitroglycerin.

n) Administer opioid per Pain Management Protocol.

CONSULT A PEDIATRIC BASE STATION FOR CHILDREN (WHO HAVE NOT REACHED THEIR 18TH BIRTHDAY) WITH CHEST PAIN WITH ASSOCIATED DYSRHYTHMIAS, CARDIAC DISEASE, OR BLUNT CHEST TRAUMA.

P. CARDIAC EMERGENCIES: HYPERKALEMIA (RENAL DIALYSIS/FAILURE OR CRUSH SYNDROME)

1. Inclusion Criteria
   Certain conditions, such as renal failure, missed hemodialysis appointments, or crush syndrome may produce an elevated serum potassium level that can cause hemodynamic complications.

2. Treatment

a) Patients must meet the following criteria:

   (1) Suspected hyperkalemia patient
      (a) Renal dialysis/failure with poor or non-functioning kidneys or
      (b) Crush syndrome or patients with functional kidneys by history
      AND
   (2) Hemodynamically unstable renal dialysis patients or patients suspected of having an elevated potassium with bradycardia and wide QRS complexes.

b) Place patient in position of comfort.

c) Assess and treat for shock, if indicated.

d) Continuously monitor airway and reassess vital signs every 5 minutes.

---

e) Establish IV access with LR.

f) Initiate Bradycardia Protocol.

g) Consider calcium chloride 0.5–1 gram SLOW IVP over 3–5 minutes. Maximum dose 1 gram or 10 mL.

h) Consider sodium bicarbonate 50 mEq IV over 5 minutes.

i) Consider albuterol 20 mg (high dose) via nebulizer (if available).

ALERT FLUSH IV WITH 5 ML OF LR BETWEEN CALCIUM AND SODIUM BICARBONATE ADMINISTRATION.

j) Crush syndrome or patients with functional kidneys by history
   Consider sodium bicarbonate 50 mEq SLOW IV over 5 minutes and then initiate drip of sodium bicarbonate 100 mEq in 1,000 mL to run over 30–60 minutes (reserve for patient suspected of crush syndrome or patients with functional kidneys by history).

P. CARDIAC EMERGENCIES: HYPERKALEMIA (Continued)

k) Place patient in position of comfort.

l) Assess and treat for shock, if indicated.

m) Continuously monitor airway and reassess vital signs every 5 minutes.

n) Establish IV access with LR.

o) Initiate Bradycardia Protocol.

p) Administer calcium chloride 20 mg/kg (0.2 mL/kg) slow IVP/IO (50 mg/min). Maximum dose 1 gram or 10 mL.

q) Consider albuterol via nebulizer
   (1) For patients 2 years of age or greater, administer albuterol 2.5 mg.
   (2) For patients less than 2 years of age, administer albuterol 1.25 mg.

ALERT FLUSH IV WITH 5 ML OF LR BETWEEN CALCIUM AND SODIUM BICARBONATE ADMINISTRATION.

r) Crush syndrome or patients with functional kidneys by history
   Consider sodium bicarbonate 1 mEq/kg IV over 5 minutes. Maximum dose 50 mEq. (Reserve for patient suspected of crush syndrome or patients with functional kidneys by history.) For patients less than 1 year of age, must be diluted (1:1) with LR.

Q. CARDIAC EMERGENCIES: IMPLANTABLE CARDIOVERTER DEFIBRILLATOR (ICD) MALFUNCTION

1. Inclusion Criteria
   ICD deactivation: Patient must meet the following criteria:
   a) Three or more distinct shocks and
   b) Obvious device malfunction with an EMS clinician-witnessed inappropriate shock (e.g., alert patient in atrial fibrillation with rapid ventricular rate or SVT)

2. Treatment
   a) Place patient in position of comfort.
   b) Assess and treat for shock if indicated.
   c) Continuously monitor airway and reassess vitals every 5 minutes.

ALERT IF PATIENT IS IN CARDIAC ARREST, PERFORM CPR AND USE AED AS APPROPRIATE DESPITE THE PATIENT'S ICD, WHICH MAY OR MAY NOT BE DELIVERING SHOCKS.

---

   d) Establish IV access with LR.
   e) Monitor cardiac rhythm and treat according to appropriate algorithm(s).
   f) Place an EMS donut magnet directly over device. Magnet placed directly over will deactivate device and shocks will not be delivered. After defibrillator is deactivated, tape magnet firmly in place and treat according to the appropriate algorithm(s).

ALERT IF THE PATIENT HAS A COMBINATION ICD AND PACEMAKER, DEACTIVATING THE ICD MAY OR MAY NOT DEACTIVATE THE PACEMAKER.

   g) Regardless of the decision to deactivate the ICD device, be prepared to manage the underlying rhythm (e.g., treat wide complex tachycardia with cardioversion or amiodarone per protocol as appropriate).

Q. CARDIAC EMERGENCIES: IMPLANTABLE CARDIOVERTER DEFIBRILLATOR (ICD) MALFUNCTION (Continued)

ALERT IF PATIENT BECOMES UNSTABLE OR IN THE EVENT OF A RHYTHM CHANGE WHERE A SHOCK IS DESIRED, REMOVE THE MAGNET TO REACTIVATE THE ICD. IF REACTIVATION DOES NOT OCCUR, USE MANUAL DEFIBRILLATOR IN ACCORDANCE WITH TACHYCARDIA PROTOCOL.

CONTINUE CHEST COMPRESSIONS FOR PEDIATRIC PATIENTS WHO REMAIN POORLY PERFUSED DESPITE PACEMAKER CAPTURE.

h) If ICD deactivation indications are questionable or deactivation is unsuccessful (or a donut magnet is not available) and undesired shocks continue, medications may be administered for patient comfort.
   (1) Administer opioid per Pain Management Protocol.
   OR
   (2) Midazolam 0.1 mg/kg SLOW IVP/IN/IM/IO. Maximum single dose is 5 mg.
   (Paramedic may perform without consult.)
   IN administration max 1 mL per nare
   IM administration requires all clinicians to obtain consultation

i) Transport to the closest appropriate facility.

– –

Consult a Pediatric Base Station for children (who have not reached their 18th birthday) with an ICD device delivering shock therapy or malfunctioning.

j) If ICD deactivation indications are questionable or deactivation is unsuccessful (or a donut magnet is not available) and undesired shocks continue, medications may be administered for patient comfort.
   (1) Administer opioid per Pain Management Protocol.
   OR
   (2) Midazolam 0.1 mg/kg SLOW IV/IO over 1–2 minutes. Maximum single IV/IN/IO dose 2 mg. Maximum total dose 5 mg. IN administration max 1 mL per nare. If IV cannot be established, administer 0.2 mg/kg IM. Max single IM dose is 5 mg. (IM requires all clinicians to obtain medical consultation.) Maximum total dose 5 mg.

k) Transport to the closest appropriate facility.

R. CARDIAC EMERGENCIES: ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

ACUTE CORONARY SYNDROME (ACS) IS DEFINED AS PATIENTS PRESENTING WITH ANGINA OR ANGINAL EQUIVALENTS SUCH AS SHORTNESS OF BREATH; CHEST, EPIGASTRIC, ARM, OR JAW PAIN OR DISCOMFORT; DIAPHORESIS; AND/OR NAUSEA.

Inclusion Criteria:
Patient presents with Acute Coronary Syndrome (ACS) symptoms and has one of the following in a diagnostic quality EKG:

a) Greater than 1 mm of ST elevation in two or more contiguous limb leads
b) Greater than 1.5 mm of ST elevation in two or more precordial leads (in women)
c) Greater than 2 mm of ST elevation in two or more precordial leads (in men)
d) Anterior, Inferior, or Lateral MI: ST elevation greater than 1 mm in two or more contiguous leads **and**
   QRS complex is narrower than 0.12 seconds; (if wider than 0.12, you are unable to diagnose as STEMI)
   OR
e) Posterior MI: ST depression greater than 1 mm in V1 and V2 with an R/S ratio of greater than or equal to one **and**
   QRS complex is narrower than 0.12 seconds; (if wider than 0.12, you are unable to diagnose as STEMI)

IF PATIENT MEETS ABOVE STEMI CRITERIA, THIS PATIENT IS A PRIORITY 1 PATIENT AND REQUIRES NOTIFICATION OF THE NEAREST DESIGNATED CARDIAC INTERVENTIONAL CENTER AS SOON AS POSSIBLE TO ALLOW FOR HOSPITAL PREPARATION. DURING THE CONSULTATION WITH THE RECEIVING FACILITY, THE CLINICIAN SHALL USE THE VERBIAGE, “STEMI ALERT” AS THE UNIVERSAL METHOD OF NOTIFYING THE FACILITY THAT THE PATIENT MEETS THE STEMI INCLUSION CRITERIA.

DETECTION OF RIGHT VENTRICULAR AND POSTERIOR WALL INFARCTION IS IMPORTANT, AS APPROXIMATELY 40% OF PATIENTS WITH INFERIOR WALL INFARCTIONS HAVE RIGHT VENTRICULAR AND/OR POSTERIOR WALL INVOLVEMENT, WHICH PREDISPOSES THEM TO MORE COMPLICATIONS AND INCREASED MORTALITY.

R. CARDIAC EMERGENCIES: ST ELEVATION MYOCARDIAL INFARCTION (STEMI) (Continued)

Consider the following presentations as indicative of increased cardiovascular risk and request guidance from the closest appropriate EMS Base Station or Cardiac Interventional Center.

a) **Left bundle branch block (LBBB)**: LBBB is rare in the setting of acute myocardial infarction and often indicates underlying cardiovascular disease. LBBB is more likely to signal a myocardial infarction if one of the following conditions are met:
   1) Patient presents in cardiogenic shock
   2) EKG shows excessive ST segment elevation greater than 5 mm
   3) EKG shows ST segment deviation (elevation or depression) in the same direction as the QRS complex. This concept is known as inappropriate concordance.

b) **Wellens' Wave**: Biphasic T waves or deeply inverted T waves in precordial leads (V2-V3, +/-V4).

c) **ST segment elevation in Lead aVR**: Multilead ST segment depression with coexisting ST segment elevation in lead aVR.

d) **Hyperacute T waves**: Peaked, broad-based T waves

1. Treatment

a) Follow Chest Pain Protocol for nitrate, aspirin, and pain management.

b) If patient meets above STEMI criteria, this patient is a Priority 1 patient and requires a medical consult.

c) If a patient meets one of the above condition sets for STEMI inclusion criteria, the patient shall be transported to the closest Cardiac Interventional Center by air or ground as long as the delivery time is not more than 45 minutes greater than transport to the nearest ED.
   (1) When indicated and based on the EMS clinician's report, the Base Station physician at the receiving Cardiac Interventional Center will activate its Cardiac Interventional Team.
   (2) The receiving ED physician will determine if the patient can bypass the ED and go directly to the cardiac catheterization lab to meet the cardiac interventional team.
   (3) If the patient cannot be delivered to a Cardiac Interventional Center within the allotted time, complete the Fibrinolytic Therapy Checklist for STEMI.
      (a) If the patient meets all of the criteria for fibrinolytic therapy, transport to the nearest ED.
      (b) If the patient does not meet all of the criteria for fibrinolytic therapy, consult with the nearest Cardiac Interventional Center and the nearest ED to determine the most appropriate receiving facility.

R. CARDIAC EMERGENCIES: ST ELEVATION MYOCARDIAL INFARCTION (STEMI) (Continued)

d) If patient does not have EKG ST elevations greater than 1 mm in two contiguous leads, the patient shall be transported to the closest appropriate facility.

e) If a patient presents with IWMI, obtain a tracing of V4R to rule out right ventricular involvement. If ST elevation noted in V4R, withhold nitrates. The triad of RVMI often includes clear lung sounds, hypotension, and JVD. 40% of IWMI have right ventricular involvement. If hypotensive with clear lung sounds, administer 250–500 mL of LR.

For additional bolus, perform medical consultation.

CONSULT A PEDIATRIC BASE STATION FOR CHILDREN WITH ST ELEVATIONS WHO HAVE **NOT** REACHED THEIR 18TH BIRTHDAY.

Fibrinolytic Therapy Checklist for STEMI

Use this checklist if a STEMI patient cannot be delivered to a Cardiac Interventional Center within 45 minutes greater than transport to the nearest ED. All of the **"YES"** boxes and all of the **"NO"** boxes must be checked before a patient should be transported to the nearest emergency department.

INCLUSION CRITERIA

(**All** of the **"YES"** boxes must be checked)

YES

- ❑ 18 years of age or older
- ❑ Signs and symptoms of STEMI
- ❑ Patient cannot be delivered to a Cardiac Interventional Center within 45 minutes greater than transport to the nearest ED

EXCLUSION CRITERIA

(If any of the **"NO"** are unchecked, clinician **must consult** with a Cardiac Interventional Center and nearest ED to determine most appropriate receiving facility.)

PATIENT HAS NO:

- ❑ Active internal bleeding (e.g., GI or urinary bleeding within the last 21 days)
- ❑ Known bleeding disorder
- ❑ Within 3 months of intracranial surgery, serious head trauma, or stroke
- ❑ Within 14 days of major surgery or serious trauma
- ❑ History of intracranial hemorrhage
- ❑ Witnessed seizure at onset
- ❑ History of cancer of the brain

S. SUDDEN INFANT DEATH SYNDROME (SIDS)

1. Inclusion Criteria

   The unexpected arrest of an apparently healthy infant in which resuscitation is unsuccessful and there is no attributable cause of death.
   The infant is often discovered by a caretaker in the early morning hours after having been uneventfully laid down to sleep the night before.

2. Treatment

   a) Perform an initial patient assessment, assign a treatment priority, and perform CPR, if indicated.

ALERT

RIGOR MORTIS MAY BE PRESENT (SEE PRONOUNCEMENT OF DEATH IN THE FIELD PROTOCOL).

   b) Move patient to the transport unit.

   c) Establish communications and obtain medical direction.

   d) If physician consultation is genuinely unavailable, monitor cardiac rhythm and treat according to the appropriate algorithm(s).

   e) Transport quickly to the closest appropriate facility.

ALERT

SIDS IS ONE OF THE LEADING CAUSES OF DEATH IN THE 1–12 MONTH AGE GROUP AND SEEMS TO PEAK AT 2 TO 4 MONTHS OF AGE.

HOW YOU INTERACT WITH THE FAMILY MAY HAVE A SIGNIFICANT IMPACT ON HOW THEY DEAL WITH THE LOSS OF THE INFANT. BE CAUTIOUS OF STATEMENTS OR ACTIONS THAT MAY BE JUDGMENTAL.

SPECIAL ATTENTION SHOULD BE PAID TO THE CONDITION OF THE INFANT, INCLUDING THE PRESENCE OF ANY MARKS OR BRUISES, AND TO PRESERVATION OF THE ENVIRONMENT, INCLUDING ANY BED CLOTHING AND THE CONDITION OF THE ROOM.
RIGOR MORTIS MAY BE PRESENT (SEE PRONOUNCEMENT OF DEATH IN THE FIELD PROTOCOL).