



2012

ACLS Study Guide



Education For Life
ACLS - BLS - CPR - PALS - ECG

Course Overview

This study guide is an outline of content that will be taught in the American Heart Association Accredited Advance Cardiac Life Support (ACLS) Course. It is intended to summarize important content, but since all ACLS content cannot possibly be absorbed in a class given every two years, it is expected that the student will have the 2010 Updated ECC Handbook readily available for review as a reference. The student is also required to have the AHA ACLS Textbook available for reference and study for more in depth content.

Evidence Based Updates

Approximately every 5 years the AHA updates the guidelines for CPR and Emergency Cardiovascular Care. These updates are necessary to ensure that all AHA courses contain the best information and recommendations that can be supported by current scientific evidence experts from outside the United States and outside the AHA. The guidelines were then classified as to the strength of evidence that supports the recommendation.

Critical Concepts – High Quality CPR

- Compress the chest hard and fast
- Allow complete chest recoil after each compression
- Minimize interruptions in compressions (10 seconds or less)
- Switch providers about every 2 minutes to avoid fatigue
- Avoid excessive ventilation

The BLS Survey

C - A - B

	Assess	Assessment Technique and Action
1	Check Responsiveness	<ul style="list-style-type: none"> • Tap and shout, “Are you all right?” • Check for absent or abnormal breathing (no breathing or only gasping) by looking at or scanning the chest for movement (about 5 to 10 seconds)
2	Activate the Emergency Response System /get AED	<ul style="list-style-type: none"> • Activate the emergency response system and get an AED if one is available or send someone to activate the emergency response system and get an AED or defibrillator
3	Circulation	<ul style="list-style-type: none"> • Check the carotid pulse for 5 to 10 seconds • If no pulse within 10 seconds, start CPR (30:2) beginning with chest compressions • Compress the center of the chest (lower half of the sternum) hard and fast with at least 100 compressions per minute at a depth of at least 2 inches • Allow complete chest recoil after each compression • Minimize interruptions in compressions (10 seconds or less) • Switch providers about every 2 minutes to avoid fatigue • Avoid excessive ventilation • If there is a pulse, start rescue breathing at 1 breathe every 5 to 6 seconds (10 to 12 breaths per minute). Check pulse about every 2 minutes.
4	Defibrillation	<ul style="list-style-type: none"> • If no pulse, check for a shockable rhythm with an AED/defibrillator as soon as it arrives • Provide shocks immediately with CPR, beginning with compressions

The ACLS Survey

For unconscious patients in arrest (cardiac or respiratory):

- Healthcare providers should conduct the ACLS Survey after completing the BLS survey.

For conscious patients who may need more advanced assessment and management technique:

- Health providers should conduct the ACLS Survey first.

An important component of this survey is the differential diagnosis, where identification and treatment of the underlying causes may be critical to patient outcome.

Effective Resuscitation Team Dynamics

Role of the Team Leader – is multifaceted. The team leader

- Organizes the group
- Monitors individual performance of team members
- Back up team members
- Models excellent team behavior
- Trains and coaches
- Facilitates understanding
- Focuses on comprehensive patient care

Role of Team Member – must be proficient in performing the skills authorized by their scope of practice.

- Clear about role assignment
- Prepared to fulfill their role responsibilities
- Well practiced in resuscitation skills
- Knowledgeable about the algorithms
- Committed to success

❖ **Closed – Loop Communications** – When communicating with resuscitation team members, the team leader should use closed – loop communication by taking these steps

- The team leader gives a message, order, or assignment to a team member
- By receiving a clear response and eye contact, the team leader confirms that the team member heard and understood the message
- The team leader listens for confirmation of task performance from the team before assigning another task.

- ❖ **Clear Messages** – Clear messages consist of concise communication spoke with distinctive speech in a controlled tone of voice. All healthcare providers should deliver messages and order in a calm and direct manner without yelling or shouting. Unclear communication can lead to unnecessary delays in treatment or to medication errors.

- ❖ **Clear Roles and Responsibilities** – Every member of the team should know his or her role and responsibilities. Just as different shaped pieces make up a jigsaw puzzle, each team member's role is unique and critical to the effective performance of the team. When roles are unclear, team performance suffers. Signs of unclear roles include:
 - Performing the same task more than once
 - Missing essential tasks
 - Freelancing of team members

- ❖ **Knowing One's Limitations** – Not only should everyone on the team know his or her own limitations and capabilities, but the team leader should also be aware of them. This allows the team leader to evaluate team resources and call for backup of team members when assistance is needed.

- ❖ **Knowledge Sharing** – Sharing information is a critical component of effective team performance. Team leaders may become trapped in a specific treatment or diagnostic approach; this common human error is called a fixation error.

- ❖ **Constructive Intervention** – During a resuscitation attempt the team leader or a team member may need to intervene if an action that is about to occur may be inappropriate at the time. Although constructive intervention is necessary, it should be tactful.

- ❖ **Reevaluation and Summarizing** – An essential role of the team leader is monitoring and reevaluating
 - The patient's status
 - Interventions that have been performed
 - Assessment findings

- ❖ **Mutual Respect** – The best teams are composed of members who share a mutual respect for each other and work together in a collegial, supportive manner. To have a high-performing team, everyone must abandon ego and respect each other during the resuscitation attempt, regardless of any additional training or experience that the team leader or specific team member may have.

System of Care

Medical Emergency Teams (METs) and Rapid Response Teams (RRTs)

- ❖ Many hospitals have implemented the use of METs or RRTs. The purpose of these teams is to improve patient outcomes by identifying and treating early clinical deterioration. In-hospital cardiac arrest is commonly preceded by physiologic changes. In one study nearly 80% of hospitalized patients with cardiorespiratory arrest had abnormal vital signs documented for up to 8 hours before the actual arrest. Many of these changes can be recognized by monitoring routine vital signs. Intervention before clinical deterioration or cardiac arrest may be possible.
- ❖ Consider this question: “Would you have done anything differently if you knew 15 minutes before the arrest that?”

The ACLS Survey

Airway Management in Respiratory Arrest - If bag-mask ventilation is adequate, providers may defer insertion of an advanced airway. Healthcare providers should make the decision to place an advanced airway during the ACLS Survey.

Advanced airway equipment includes the laryngeal mask airway, the laryngeal tube, the esophageal-tracheal tube and the ET tube. If it is within your scope of practice, you may use advanced airway equipment in the course when appropriate and available.

Basic Airway Adjuncts: Oropharyngeal Airway

The OPA is used in patients who are at risk for developing airway obstruction from the tongue or from relaxed upper airway muscle. This J-shaped device fits over the tongue to hold it and the soft hypopharyngeal structures away from the posterior wall of the pharynx.

Quantitative waveform
capnography (if PETCO₂ is <10mm
Hg, attempt to improve CPR quality)

Place the OPA against the side of the face. When the tip of the OPA is at the corner of the mouth, the flange is at the angle of the mandible. A properly sized and inserted OPA results in proper alignment with the glottis opening.

The OPA is used in unconscious patients if procedures to open the airway fail to provide and maintain a clear, unobstructed airway. An OPA should not be used in a conscious or semiconscious patient because it may stimulate gagging and vomiting. The key assessment is to check whether the patient has an intact cough and gag reflex. If so, do not use an OPA.

Basic Airway Adjuncts: Nasopharyngeal Airway

The NPA is used as an alternative to an OPA in patients who need a basic airway management adjunct. The NPA is a soft rubber or plastic uncuffed tube that provides a conduit for airflow between the nares and the pharynx.

Unlike oral airway, NPAs may be used in conscious or semiconscious patients (patients with an intact cough and gag reflex). The NPA is indicated when insertion of an OPA is technically difficult or dangerous.

Suctioning

Suctioning is an essential component of maintaining a patient's airway. Providers should suction the airway immediately if there are copious secretions, blood, or vomit.

Monitor patient's heart rate, pulse oxygen saturation, and clinical appearance during suctioning. If bradycardia develops, oxygen saturation drops, or clinical appearance deteriorates, interrupt suctioning at once. Administer high-flow oxygen until the heart rate return to normal and clinical condition improves. Assist ventilation as needed.

Suctioning attempted should not exceed 10 seconds. To avoid hypoxemia, precede and follow suctioning attempts with a short period of administration of 100% oxygen.

Providing Ventilation with an Advanced Airway

Selection of an advanced airway device depends on the training, scope of practice, and equipment of the providers on the resuscitation team. Advanced Airway includes:

- ❖ **Laryngeal mask airway** – is an advanced airway alternative to endotracheal intubation and provides comparable ventilation. It is acceptable to use the laryngeal mask airway as an alternative to an ET tube for airway management in cardiac arrest.
- ❖ **Laryngeal tube** – The advantages of the laryngeal tube are similar to those of the esophageal-tracheal tube; however, the laryngeal tube is more compact and less complicated to insert.
- ❖ **Esophageal-tracheal tube** – The esophageal-tracheal tube is an advanced airway alternative to endotracheal intubation. This device provides adequate ventilation comparable to an ET tube.
- ❖ **Endotracheal tube** – A brief summary of the basic steps for performing endotracheal intubation is given here to familiarize the ACLS provider who may assist with the procedure.
 - Prepare for intubation by assembling the necessary equipment
 - Perform endotracheal intubation
 - Inflate cuff or cuffs on the tube
 - Attach the ventilation bag
 - Confirm correct placement by physical examination of a confirmation device. Continuous waveform capnography is recommended (in addition to clinical assessment) as the most reliable method of confirming and monitoring correct placement of an ET tube.
 - Secure the tube in place
 - Monitor for displacement

Cricoid pressure in nonarrest patients may offer some measure of protection to the airway from aspiration and gastric insufflation during bag-mask ventilation. However, it also may impede ventilation and interfere with placement of a supraglottic airway or intubation.

Cricoid Pressure is NOT recommended

Purpose of Defibrillation

Defibrillation does not restart the heart. Defibrillation stuns the heart and briefly terminates all electrical activity, including VF and VT. If the heart is still viable, its normal pacemaker may eventually resume electrical activity (return of spontaneous rhythm) that ultimately results in a perfusing rhythm (ROSC).

Principle of Early Defibrillation



If the AED does not promptly analyze the rhythm, do the following:

- Resume high-quality chest compressions and ventilations
- Check all connections between the AED and the patient to make sure that they are intact.
- NEVER delay chest compressions to troubleshoot the AED



The earlier defibrillation occurs, the higher the survival rate. When VF is present, CPR can provide a small amount of blood flow to the heart and brain but cannot directly restore an organized rhythm. The likelihood of restoring a perfusing rhythm is optimized with immediate CPR and defibrillation within a few minutes of the initial arrest.

Restoration of a perfusing rhythm requires immediate CPR and defibrillation within a few minutes of the initial arrest.

Delivering Shock

The appropriate energy dose is determined by the identity of the defibrillator – monophasic or biphasic.

If you are using a monophasic defibrillator, give a single 360-J shock. Use the same energy dose of subsequent shocks.

Biphasic defibrillators use a variety of waveforms, each of which is effective for terminating VF over a specific dose range. When using biphasic defibrillators, providers should use the manufacturer's recommended energy dose (eg, initial dose of 120 to 200 J). Many biphasic defibrillator manufacturers display the effective energy dose range on the face of the device.

To minimize interruptions in chest compressions during CPR, continue CPR while the defibrillator is charging. Immediately after the shock, resume CPR, beginning with chest compressions. Give 2 minutes (about 5 cycles) of CPR. A cycle consists of 30 compressions followed by 2 ventilations in the patient without an advanced airway.

Synchronized vs. Unsynchronized Shocks

Synchronized

- Cardioversion uses a sensor to deliver a shock that is synchronized with a peak of the QRS complex
- Synchronized cardioversion uses a lower energy level than attempted defibrillation.
- When to use synchronized shock
 - Unstable SVT
 - Unstable Atrial Fibrillation
 - Unstable Atrial Flutter
 - Unstable regular monomorphic tachycardia with pulse

Unsynchronized

- Means that the electrical shock will be delivered as soon as the operator pushes the SHOCK button to discharge the device.
- May fall randomly anywhere within the cardiac cycle.
- When to use Unsynchronized Shocks
 - For a patient who is pulseless
 - For a patient demonstrating clinical deterioration (in prearrest), such as those with severe shock or polymorphic VT, you think a delay in converting the rhythm will result in cardiac arrest

Foundational Facts:

- Be sure oxygen is not flowing across the patients' chest when delivering shock

The pause in chest compressions to check the rhythm should not exceed 10 seconds

- Perform a pulse check – preferably during rhythm analysis – only if an organized rhythm is present.

After you have completed your first 2-minute period of CPR, have a team member attempt to palpate a carotid pulse.

- If the PETCO₂ is
- <10 mm Hg during CPR, it is reasonable to try to improve chest compressions and vasopressor therapy.

- When you are unsure whether monomorphic or polymorphic VT is present in the unstable patient.

Routes of Access for Drugs

Historically in ACLS, providers have administered drugs via either the IV or endotracheal route. Endotracheal absorption of drugs is poor and optimal drug dosing is not known. For this reason, the IO route is preferred when IV access is not available. Priorities for vascular access are:

- IV Route - A peripheral IV is preferred for drug and fluid administration unless central line access is already available. Central line access is not necessary during most resuscitation attempts.
- IO Route - Drugs and fluids during resuscitation can be delivered safely and effectively via the IO route if IV access is not available. Important points about IO access are:

ACLS Algorithm Review

ACUTE CORONARY SYNDROME

The ACLS provider Course presents only basic knowledge focusing on early treatment and the priority of rapid reperfusion, relief of ischemic pain, and treatment of early life-threatening complications. Reperfusion may involve the use of fibrinolytic therapy or coronary angiography with PCI (ie, balloon angioplasty/stenting).

Symptoms Suggestive of Ischemia or Infarction

- EMS assessment and care and hospital preparation:
 - Monitor, support ABCs. Be prepared to provide CPR and defibrillation
 - Administer aspirin and consider oxygen, nitroglycerin, and morphine if needed
 - Obtain 12-lead ECG; if ST elevation:
 - Notify hospital should mobilize hospital resources to respond to STEMI

IMMEDIATE ED GENERAL TREATMENT

- IF O2 SAT <94% START OXYGEN AT 4L/MIN, TITRATE
- ASPIRIN 160 TO 325 MG (IF NOT GIVEN BY EMS)
- NITROGLYCERIN SUBLINGUAL OR SPRAY
- MORPHINE IV IF DISCOMFORT NOT

fibrinolysis checklist.

- Concurrent ED assessment (<10 minutes)
 - Check vital signs; evaluate oxygen saturation
 - Establish IV access
 - Perform brief, targeted history, physical exam
 - Review/complete fibrinolytic checklist; check contraindications
 - Obtain initial cardiac marker level, initial electrolyte and coagulation studies
 - Obtain portable chest x-ray (<30 minutes)

Relief of pain with nitroglycerin is neither specific nor a useful diagnostic tool to determine the etiology of symptoms in ED patients with chest pain or discomfort. GI etiologies as well as other causes of chest discomfort can “respond” to nitroglycerin administration. Therefore, the response to nitrate therapy is not diagnostic of ACS.

The 12-lead ECG is at the center of the decision pathway in the management of ischemic chest discomfort and is the only means of identifying STEMI

General Group	Description
STEMI	ST elevation in or more contiguous leads or new LBBB. Threshold values for ST-segment elevation consistent with STEMI are J-point elevation greater than 2mm (0.2mV) in leads V2 and V3 and 1mm or more in all other leads or by new or presumed new LBBB. 2.5mm in men >40 years; 1.5 mm in all women
High-risk UA/NSTEMI	ST depression or dynamic T-wave inversion – is characterized by ischemic ST-segment depression (0.05mV) or dynamic T-wave inversion with pain or discomfort.
Intermediate/low-risk UA	Normal or nondiagnostic ECG – Serial cardiac studies and functional testing are appropriate. Note that additional information (troponin) may place the patient into a higher risk classification after initial classification.

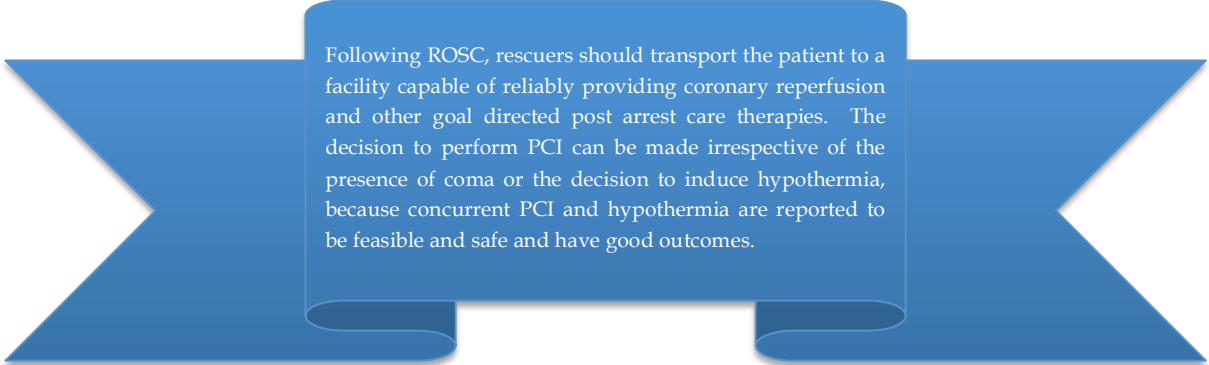
Use of Fibrinolytic Therapy

A fibrinolytic agent or “clot buster” is administered to patients with J-point ST-segment

Use of PCI

The most commonly used form of PCI is coronary intervention with stent placement. Primary PCI is used as an alternative to fibrinolytics. Rescue PCI is used early after fibrinolytics in patients who may have persistent occlusion of the infarct artery (failure to reperfusion with fibrinolytics).

Immediate Coronary Reperfusion with PCI



Following ROSC, rescuers should transport the patient to a facility capable of reliably providing coronary reperfusion and other goal directed post arrest care therapies. The decision to perform PCI can be made irrespective of the presence of coma or the decision to induce hypothermia, because concurrent PCI and hypothermia are reported to be feasible and safe and have good outcomes.

Adjunction Treatment

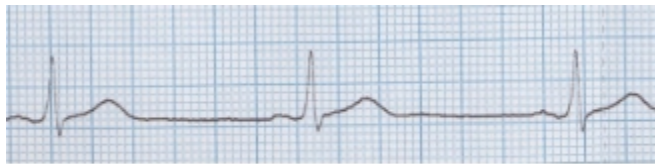
Other drugs are useful when indicated in addition to oxygen, sublingual or spray nitroglycerin, aspirin, morphine, and fibrinolytic therapy. These include:

- IV nitroglycerin
- Heparin
- Clopidogrel
- B-Blockers
- ACE inhibitors
- HMG-CoA reductase inhibitor therapy (statin)

Bradycardia

Bradycardia occurs when the heart is beating too slow (<50 beats per minute). If symptomatic, provide oxygen, given Atropine 0.5mg up to 3mg and call for the transcutaneous pacemaker.

In Sinus Bradycardia, the SA node fires at a rate slower than normal for a person's age. Athletes may have heart rates less than 50 due to their physical conditioning. Obviously, they would not need treatment. It is possible for patient to have a heart rate of 50 and be asymptomatic; however, if a patient with a heart rate of less than 50 has signs of poor perfusion, begin treatment with oxygen and Atropine 0.5mg



Sinus Bradycardia

Treatment

Give atropine as first-line treatment	Atropine 0.5 mg IV - may repeat to a total dose of 3 mg
If atropine is ineffective	
Transcutaneous pacing	OR <ul style="list-style-type: none">Dopamine 2 to 10 mcg/kg per minute (chronotropic or heart rate dose)Epinephrine 2 to 10 mcg/min

Sinus Tachycardia

Sinus tachycardia occurs when the SA node is firing at a rate that is faster than normal for a person's age. The rate is generally 101 to 150 bpm. The key to sinus tachycardia is that all components of a normal ECG are present, P wave, QRS complexes, and T wave. Sinus tachycardia generally starts and stops gradually. There is often a cause such as pain, fever, or agitation that can be identified and treated.



Supraventricular Tachycardia

Supraventricular Tachycardia (SVT) includes any rhythm that begins above the bundle branches. This includes rhythm that begins in the SA node, atrial tissue, or the AV junction. Since the rhythms arise from above the bundle branches, they are characterized by narrow QRS complexes. A supraventricular tachycardia is not the name of a specific arrhythmia. It is a term used to describe a category of regular arrhythmias that cannot be identified more accurately because they have indistinguishable P waves due to their fast rate – usually greater than 150 bpm. The P waves are often indistinguishable because they run into the preceding T waves. The most common SVT rhythms are atrial tachycardia and junctional tachycardia, although Sinus Tachycardia and Atrial Flutter can sometimes also fit into their category with indistinguishable P waves.



Treatment Question #1 – Stable vs. Unstable

If Unstable – Cardiovert

If Stable, answer question #2

*Treatment Questions #2 – Regular vs. Irregular
Rhythm*

Regular (SVT or Junctional) = Vagal maneuvers

Adenosine (1st dose = 6mg)

Adenosine (2nd dose = 12mg)

Irregular (A-Fib, A-Flutter, Multi-focal A-Tach) =

Calcium Channel Blockers or Beta Blockers

A = A-fib, A-Flutter

B = Beta Blockers

***C = Calcium Channel Blockers (usually used 1st to
slow the rate)***

FYI 2010 Guidelines

*NO ATROPINE DURING ASYSTOLE
or PEA*

*Although there is no evidence that atropine has a detrimental effect during bradycardic or asystolic cardiac arrest, routine use of atropine during PEA or asystole is unlikely to have a therapeutic benefit. **The AHA removed atropine from the Cardiac Arrest Algorithm.***

Interruption of chest compression to conduct a rhythm check should not exceed 10 seconds.

Available scientific studies demonstrate that in the absence of mitigating factors, prolonged resuscitative efforts are unlikely to be successful. The final decision to stop resuscitative efforts can never be as simple as an isolated time interval.

Ventricular Fibrillation

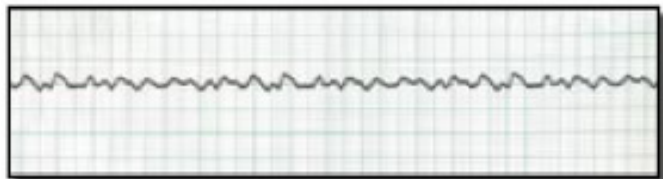
Ventricular Fibrillation (V-Fib or VF) is the most common rhythm that occurs immediately after cardiac arrest. In this rhythm, the ventricles quiver and are unable to uniformly contract to pump blood. It is for this reason that early defibrillation is so imperative. A victim's chance of survival diminishes rapidly over time once the heart goes into V-Fib; therefore, each minute counts when initiating defibrillation.

When defibrillating, heart stops hoping that the heart is viable for normal pacemaker to initiate a

There are two types of VF, fine and course. Course VF usually occurs immediately after a cardiac arrest and has a better prognosis with defibrillation. Fine VF has waves that are nearly flat and look similar to asystole. Fine VF often develops after more prolonged cardiac arrest and is much more difficult to correct.



Course VF

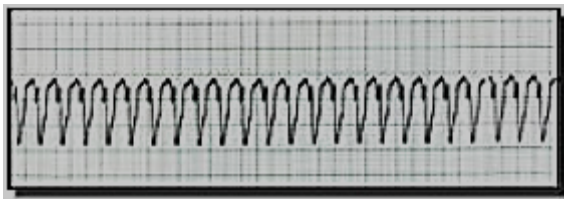


Fine VF

Ventricular Tachycardia

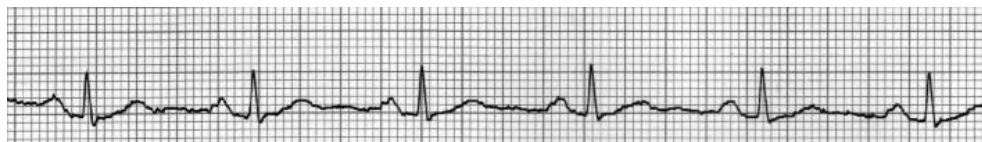
- Stable vs Unstable
- Pulse vs No Pulse

Ventricular Tachycardia (VT) can present itself with or without a pulse. When a VT is present and the victim has no pulse, the treatment is the same as the VF. High dose shocks for defibrillation will give the best chance for converting the patient out of pulseless VT.



Pulseless Electrical Activity

Pulseless Electrical Activity (PEA) occurs when the heart is beating and has a rhythm, it can be any rhythm, but the patient does not have a pulse. Always treat the patient, not the rhythm.

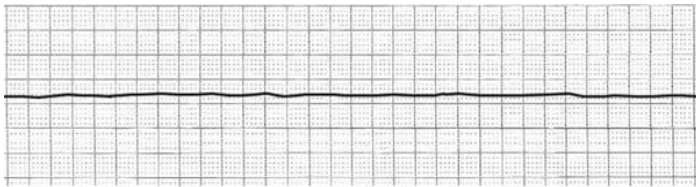


1. Problem or Possible correctable causes (H's & T's)
2. Epinephrine 1mg 1:10,000 – give to anyone WITHOUT a pulse

In order to treat pulseless rhythm, bradycardia, or tachycardia, identification of the possible underlying causes is essential.

Asystole

Asystole is when there is no detectable cardiac activity on EKG. It may occur immediately after cardiac arrest or may follow VF or PEA. Asystole may also follow a third degree heart block. Treatment of asystole is the same as PEA. The American Heart Association recommends that if a patient is in sustained Asystole for 15 minutes, it is reasonable to call the code, but involve the family in the decision if they are available.



- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

Confirming Asystole

- Give priority to IV/IO access. Do not routinely insert an advanced airway unless ventilations with a bag mask are ineffective. Do not interrupt CPR while establishing IV or IO access.

Terminating Resuscitation Efforts

If rescuers cannot rapidly identify a reversible cause and the patient fails to respond to the BLS and ACLS Surveys and subsequent interventions, termination of all resuscitative efforts should be considered.

The decision to terminate resuscitative efforts rests with the treating physician in the hospital and is based on consideration of many factors, including:

- Time from collapse to CPR
- Time from collapse to first defibrillation attempt
- Comorbid disease
- Prearrest state
- Initial arrest rhythm
- Response to resuscitative measures

Application of the Immediate Post-Cardiac Arrest Care Algorithm

To protect the brain and other organs, the resuscitation team should induce therapeutic hypothermia in adult patients who remain comatose (lack of meaningful response to verbal commands) with ROSC after out-of-hospital VF Cardiac Arrest.

- Healthcare provider should cool patients to a target temperature of 32C to 34 C for a period of 12 to 24 hours.
- In comatose patients who spontaneously develop a mild degree of hypothermia (>32C) after resuscitation from cardiac arrest, avoid active rewarming during the first 12 to 24 hours after ROSC.
- Therapeutic hypothermia is the only intervention demonstrated to improve neurologic recovery after cardiac arrest.
- Induced hypothermia should not affect the decision to perform PCI, because concurrent PCI and hypothermia are reported to be feasible and safe.

Issues to anticipate during Therapeutic Hypothermia:

1. **Hypokalemia** (due both to intracellular shift and cold diuresis). Will at least partially correct during rewarming due to ion shift, so do NOT aggressively replace potassium during cooling (replace when K < 3.4 mEq/L, recheck).
2. **Magnesium, Calcium and Phosphate** may also need replacement due to cold diuresis.
3. Consider **EEG** if neuromuscular blockers (paralysis) required, as risk of **seizure** during hypothermia. If shivering occurs, try narcotics for shivering control before using neuromuscular blockers.
4. Anticipate **Brady dysrhythmias** during hypothermia.
5. **Blood pressure** may be elevated during hypothermia (vasoconstriction), or may decrease secondary to cold diuresis. Anticipate hypotension during re-warming secondary to vasodilation.
6. **Hyperglycemia** is common during hypothermia. Vasoconstriction may cause finger-stick accuchecks to be inaccurate.
7. Rapid rewarming may lead to **SIRS and hyperthermia**; avoid warming more than **0.5 degrees C per hour, do not overshoot 36.5 C**.
8. Anticipate **ileus** during hypothermia. Incidental elevations of amylase/lipase have also been reported.
9. Do **NOT** administer any **medications labeled "do not refrigerate"** to patient. This includes **Mannitol**, which may precipitate if cooled.
10. The patient should be monitored for hypothermia during the rewarming process. If the patient is hypothermic, the rewarming process should be delayed until the patient is normothermic.

ACUTE STROKE

It refers to acute neurologic impairment that follows interruption in blood supply to a specific area of the brain.

Two types of Strokes

- Ischemic Stroke - accounts for 87% of all strokes and is usually caused by an occlusion of an artery to a region of the brain
- Hemorrhagic Stroke - accounts for 13% of all strokes and occurs when a blood vessel in the brain suddenly ruptures into the surrounding tissue.

ALL PATIENTS ARE CONSIDERED NPO

Before giving anything (medication or food) by mouth, you MUST perform bedside swallow screening.

The goal of stroke care is to minimize brain injury and maximize the patient's recovery.

- Rapid Recognition and reaction to stroke warning signs
- Rapid EMS dispatch
- Rapid EMS system transport and prearrival notification to the receiving hospital
- Rapid diagnosis and treatment in the hospital

Foundational Facts

The 8D's of Stroke Care

The 8 D's of Stroke Care highlight the major steps of diagnosis and treatment of stroke and key points at which delays can occur:

- **Detection:** Rapid recognition of stroke systems
- **Dispatch:** Early activation and dispatch of EMS by 911
- **Delivery:** Rapid EMS identification, management, and transport
- **Door:** Appropriate triage to stroke center
- **Data:** Rapid triage, evaluation, and management within the ED
- **Decision:** Stroke expertise and therapy selection
- **Drug:** Fibrinolytic therapy, intra-arterial strategies
- **Disposition:** Rapid admission to the stroke unit or critical Care Unit

Patients with stroke who require hospitalization should be admitted to a stroke unit when a stroke unit with a multidisciplinary team experienced in managing stroke is available within a reasonable transport interval.

The goal of the stroke team, emergency physician, or other experts should be to assess the patient with suspected stroke within 10 minutes of arrival in the ED: "TIME IS BRAIN"

The CT scan should be completed within 25 minutes of the patient's arrival in the ED and should be read within 45 minutes from performance: "TIME IS BRAIN"

Cincinnati Prehospital Stroke Scale

Test	Findings
Facial Droop: Have patient show teeth or smile	Normal – Both sides of face move equal Abnormal – one side of face does not move as well as the other side
Arm Drift: Patient closes eyes and extends both arms straight out, with palms up, for 10 seconds	Normal – both arms move the same or both arms do not move at all (other findings, such as pronator drift, may be helpful) Abnormal – one arm does not move or one arm drifts down compared with the other.
Abnormal Speech: Have patient say “you can’t teach an old dog new tricks”	Normal – patient uses correct words with no slurring Abnormal – patient slurs words, uses the wrong words, or is unable to speak

Interpretation: If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%. The presence of all 3 findings indicate that the probability of stroke is >85%.

The American Heart Association strongly promotes knowledge and proficiency in BLS, ACLS, and PALS and has developed instructional materials for this purpose. Use this materials in an educational course does not represent course sponsorship by the American Heart Association.

Credits:

*All diagram and lingo taken from
American Heart Association
textbooks: ACLS for Healthcare
Providers 2010)*