

FLORIDA HEART

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"Professional Training in a relaxed atmosphere".

Advanced Cardiovascular Life Support

Student Supplement 2020-2025

The information in this prep packet is based on the ILCOR and ECC 2020 Guidelines



Enclosed you will find preparatory information for the ACLS class, Algorithms, Basic Life Support reviews as well as EKG practice and pharmacology review.

****It is MANDATORY that you have an AHA ACLS textbook for class, and that you bring a printed copy of your AHA Pre-course assessment that is taken online. You must pass this assessment with a 70% to proceed in class. (Instructions are included within). If you are scheduled to take a BLS recertification course as a part of the ACLS class, please review the BLS summary included in this packet.**

Student name: _____

Date of your course: _____ Time: _____

Location: _____

Contact the office with any questions at 772.388.5252

Web: www.floridaheartcpr.com Florida Heart CPR*, 3455 Airport West Drive, Vero Beach, FL 32960

[ACLS Student Pre-course Letter](#)

Dear **ACLS** student:

Thank you for choosing Florida Heart to be your ACLS provider! The ACLS Provider Course is designed to teach you the lifesaving skills required to be both a team member and a team leader in either an in-hospital or out-of-hospital setting. Because the ACLS Provider Course covers extensive material in a short time, you will need to prepare for the course beforehand.

TO PREPARE for the ACLS or ACLS-R course, please follow these directions:

Mandatory Pre-course testing.

1. Visit **elearning.heart.org/courses**.
2. In the search bar, find the course name (ACLS Pre-course Self Assessment).
3. Choose the “ACLS Pre-course Self Assessment and ACLS Pre-course Work” course, then select “Launch the Course” to begin.

Note: If you have not already logged in, the system will ask you to do so. If you have not visited the site before, you will be prompted to set up an account.

How to Get Ready

The ACLS Course is designed to teach you the lifesaving skills required to be both a team member and a Team Leader in either an in-hospital or out-of-hospital setting. Because the ACLS Course covers extensive material in a short time, you will need to prepare for the course beforehand.

Pre-course Requirements

You should **prepare for class** by doing the following:

1. Review and understand the information in your *ACLS Provider Manual*.
2. Review, understand, and **pass the mandatory pre-course self-assessment**.
3. Review, understand, and **complete the mandatory pre-course work (video lessons)**. You must pass the pre-course self-assessment before gaining access to the video lessons. Once you have passed the ACLS Pre-course Self-Assessment and completed the video lessons, print your certificate, and bring it with you to class.
4. Ensure that your BLS skills and knowledge are current for the resuscitation scenarios. You will be tested on adult high-quality BLS skills using a feedback manikin at the beginning of the ACLS Course. You must know this in advance because you will not be taught how to do CPR or use an AED.

The pre-course test will assess your knowledge of EKG rhythms, pharmacology, and practical application. **You must complete this exercise with a score of 70% or better. You can take it as many times as you want. Print the score page and bring it with you. If you do not bring it, or you fail it, you will be rescheduled to take the class another day. No exceptions.**

Copy and paste this link to review EKG's:

<https://www.skillstat.com/tools/ecg-simulator>.

There is also an EKG practice enclosed in this prep packet.

1. Study the pharmacology in your book to review your drugs, indications, doses and contraindications. **You must know this material before coming to class.**
2. Complete the study guide (enclosed). **This is a very important part of your preparation. Look up all the answers in the ACLS book. This will help your preparation immensely!!**
3. Review and be familiar with the 2020 ACLS algorithms. The algorithms are enclosed. You may want to have someone quiz you on these clinical actions. **Your success in class depends on good preparation and reviewing the material before you take your course.** . **Do not wait until the night before class to do your pre-course work!**

The resuscitation scenarios require that your BLS skills and knowledge are current. You will be tested on adult 1-rescuer CPR and AED skills during the ACLS Course after a quick review of the materials. **You will not be taught how to do CPR or how to use an AED. You must know this in advance of the course.** Note: The course is done in a hands-on format. The AHA requires you to do vigorous, real time CPR during the course. If you have any conditions that would limit your ability to do CPR, please notify the instructor.

What This Course Does Not Cover

The ACLS Provider Course does not teach ECG or pharmacology. *If you do not learn and understand the ECG and pharmacology information in the pre-course assessment tests, it is unlikely that you can successfully complete the ACLS Provider Course. Please call our office if you feel you need an **ACLS prep course** prior to attending your ACLS course.*

What to Bring: Bring your *ACLS Provider Manual* to class to refer to during the case discussions. You may also refer to the *Handbook of Emergency Cardiovascular Care for Healthcare Providers (optional)*, and you may bring it to the course to use as a reference guide during some of the stations in the course

You will now be able to use the ACLS student text as a resource during the written evaluation. You may purchase a textbook or e-book on the **Worldpoint.com** website

*****If you are taking this course for the first time, please begin studying the materials at least two weeks in advance. You MUST have a general understanding of the material prior to class. If this is a renewal course, please be ready for a fast paced review!**

We look forward to having you in class! If you have any questions about the course please call us well in advance of the course at (772) 388-5252.

Florida Heart CPR*

Authorized American Heart Association Training Center

Summary of 2020 changes for CPR & Basic Life Support

- ♥ Do as much CPR as you can prior to defibrillation. (This can translate to 30-60 seconds or more of high-quality CPR).
- ♥ Allow for full chest recoil between compressions.
- ♥ Minimize interruptions in chest compressions to 10 seconds or less. If the patient is intubated, continue compressions uninterrupted with 1 breath every 6 seconds.
- ♥ After defibrillation, return immediately to chest compressions with no pulse check. Hover over the patient in preparation to continue CPR!
- ♥ The rate of chest compressions is **100-120** per minute for all age groups.
- ♥ Depth of compressions on adults should reach **at least 2 inches**, (but no more than 2.4 inches).
- ♥ Pediatric patients should be compressed about 2 inches, or **1/3rd the anterior/posterior diameter of the chest.**

The following recommendations are for the BLS-HCP course only:

- ♥ A suggested rate of 10 breaths a minute for *rescue breathing only* (no chest compressions) or for ADULT patients that are *intubated with an advanced airway*. **This is one breath every 6 seconds. Infants and children get rescue breaths at 1 breath every 2-3 seconds. (20-30/min.)**
- ♥ Defibrillate within 30 seconds of arrival of the AED/Monitor-defibrillator. Then immediately resume CPR.
- ♥ For CPR on infants, use 2 fingers to compress the chest, or the 2-thumb encircling hand technique (for one or two rescuers).
- ♥ **Combine** your initial breathing and pulse check to save time (BLS only).
- ♥ **Do not over-ventilate! This causes increased intrathoracic pressure and reduces cardiac output. Squeeze the BVM just enough to make the chest rise.**
- ♥ **Choking: infants get 5 back slaps/5 chest thrusts; adults and children over the age of 1 should get abdominal thrusts.**

- ♥ **Pre-charge the defibrillator 15 seconds before the rhythm check, and hover over the patient with your hands to facilitate immediate CPR after the shock!**

Other BLS considerations: You may see this again somewhere.....

- ♥ How long should you check for a pulse?
- ♥ How should we open the airway of a possible spinal injury patient?
- ♥ What are the depths of compressions for all ages?
- ♥ What is full chest recoil?
- ♥ What are the compression-ventilation ratios for all ages and number of rescuers?
- ♥ How do we avoid air in the stomach during ventilation?
- ♥ How does an AED work?
- ♥ What are compression-ventilation ratios on an intubated patient?
- ♥ What are the procedures for choking on all ages, both conscious and unconscious?



How do I study for the ACLS course?

It is important to study and prepare for the course well in advance of your course date. Give yourself at least 2 weeks of review to prepare for the class. Students who prepare in advance do significantly better in the ACLS course.



Read the book! The new 2020 ECC Guidelines version of the ACLS student textbook is very informative and goes over each case in a streamlined manner. In other words, an easy read!



Get some Rhythm!

Go to the EKG Skills Stat program online (skillstat.com) to identify each of the ACLS strips. Test yourself by putting it in “game” mode and see how many EKG’s you can identify after reviewing the strips. Remember, if you can’t identify an arrhythmia, you can’t effectively treat the rhythm or the patient. Concentrate on the following rhythms: A-fib, A-flutter, SVT, V-Tach, V-fib, and Bradycardia. Keep your algorithms close by so you can compare treatment modalities. Is it sinking in yet? **NOTE:** *You must know your strips to participate in the ACLS course, and we do NOT teach EKG in the course. Call the office if you’re having difficulty identifying EKG’s and we can direct you to a prep course. You can also order an online prep class for EKG and pharmacology online at Worldpoint.com.*



Take the ACLS Practice Quiz/Study Guide

Read the study guide in this packet and use it as a tool to look up the answers in the ACLS textbook. Use it to review the core material before the written test.



Study your drugs and dosages

A Pharmacology review is included in this packet. Familiarize yourself with the drugs you will use in ACLS, their classifications, indications and dosages. Knowing what drugs and dosages to use in a code is critical to a successful outcome.



Study the algorithms!

Study the treatments for each algorithm while viewing dynamic EKG strips on the website. It will help you to correlate your treatments. Have someone at home quiz you on your algorithms and test questions.

CALL US WELL IN ADVANCE OF THE COURSE IF YOU HAVE ANY QUESTIONS!! GOOD LUCK!!!

Florida Heart office 772.388.5252

What is ACLS?

Well, mostly, and most importantly.....it's BLS. Lots and lots of good basic life support, good communication, a team that works well together, a little electricity.....medications, defibrillation, all with the goal of Return of Spontaneous Circulation, or ROSC.

The Team Concept

Teams that communicate and work together with the goal of resuscitation in mind share some unique and important practices. Many different levels of professional medical providers are involved in a successful cardiac arrest: Physicians, paramedics, registered nurses, pharmacologists, respiratory therapists, patient care techs just to name a few.

Team Leader: The role of the team leader, frequently the physician, is to clearly define the roles of the team, make good eye contact, lead the team and watch the entire code with the goal of orchestrating the entire event. If the team leader observes a team member struggling to fulfill their role, they should reassign the team member to a role in which they are more comfortable and competent. If a team member is assigned a role they are not able to fulfill, they should immediately notify the team leader and ask for a new role.

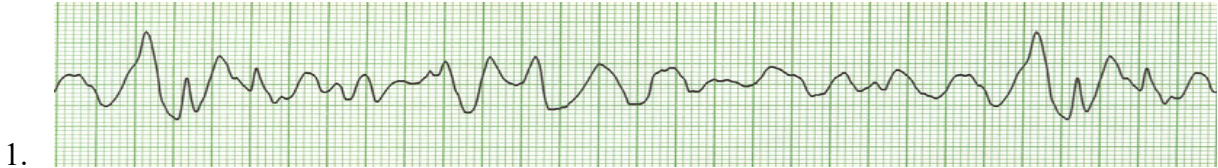
There are typically 6 roles that are performed in a code: Team leader, airway, compressor, monitor/defibrillator, IV and medication administration and the timer/recorder. If you have less than 6 people, some members can take on multiple roles. Sometimes too many people arrive at a code. It's okay to clear the room to make the code more organized and efficient.

The team should concentrate on working together for the good of the patient in order to resuscitate the patient successfully. This goal is accomplished by good communication, knowledge of ACLS algorithms, good skills and organization. Closed loop communication helps to accomplish this as the team leader gives directions and each team member acknowledges the directive and repeats it back to the team leader. This will minimize mistakes, such as in drug dosages or other interventions. Each team member should be free to contribute to the knowledge base, using observations and clear feedback. Conversely everyone should get a time out if they see an intervention that is incorrect. (Are you sure that is the correct dose of that drug?). Remember: we are trying to save a life!

We will discuss more of these concepts in class!

ACLS PRACTICE STRIPS

THIS IS A 5 MINUTE EXERCISE!! IDENTIFY RHYTHM AND DESCRIBE INITIAL TREATMENT.



HR: 0



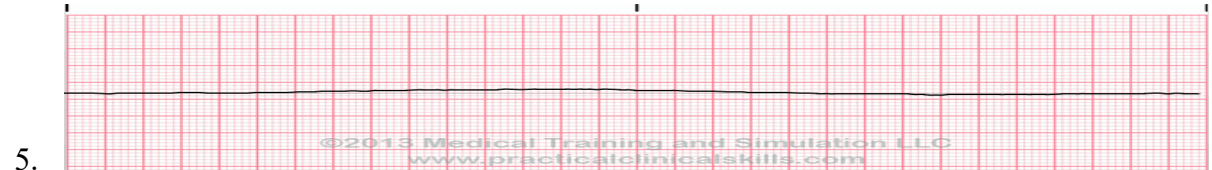
HR: 190



HR: 198



HR: 37



6.

9

7.



HR: CANNOT BE DETERMINED

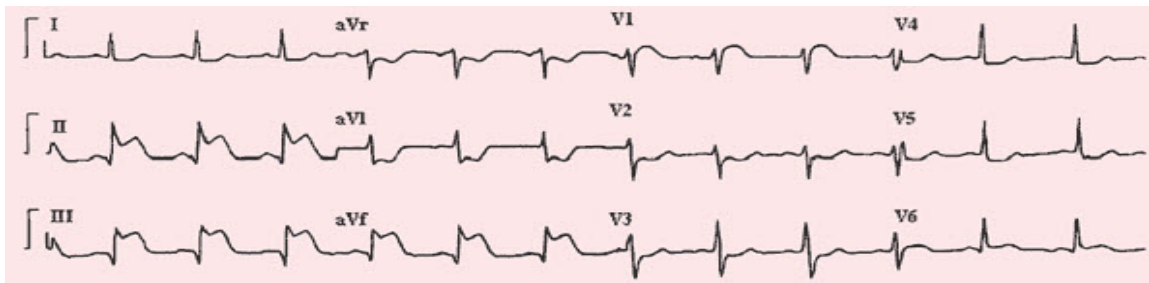
8.



HR: 72

9.

8.



The following rhythm has NO PULSE ↓

9.



FLORIDA HEART CPR*

ACLS PHARMACOLOGY OVERVIEW

According to the American Heart Association, there are very few drugs that are well supported when dealing with cardiac arrest and pre-arrest arrhythmias. Because of this, priority is placed on high quality CPR, Defibrillation, airway management and lastly the use of IV drugs.

IV Medications

Medications are normally given by the IV route, preferably through a large IV catheter such as an 18g. A peripherally inserted IV is best placed in the antecubital area, but can also be placed in the external jugular, radial or forearm. Just get the IV! If peripheral IV cannulation is difficult, consider using an IO access. Intraosseous access is just as effective as peripheral IV! Each medication should be drawn up in advance and be ready to administer on the team leaders order, and followed by flushing the IV with a 10-20mL saline flush or by squeezing the IV bag to flush the line. Currently, endotracheal administration of medications is a last resort and is not a reliable method.

We are trying to resuscitate and restore adequate coronary and cerebral perfusion. We are treating a real person, not a monitor. Staring at the monitor does not save the patient. If you get stuck, ask the team for help and suggestions. Provide good, high quality BLS to maintain perfusion and circulate the medications you are giving. Continuously search for a cause of the cardiac arrest, and work to correct them. Think H's and T's! The AHA currently recommends the use of mechanical CPR devices to maintain high quality CPR and perfusion.

During Cardiac Arrest:

- Establish 2 patent IVs (18 gauge or larger) or establish IO line

Meds should be followed by 10-20cc of NS, perform 2 minutes of CPR before next intervention, draw up next drug needed/anticipated before next rhythm check. **Only administer meds while CPR is in progress, to reach full central circulation quickly and maximize efficacy of drug*

OXYGEN

Indications:	Pts with SaO ₂ below 90% or in respiratory distress, Hypoxia of any cause, Cardiac arrest
Actions:	Reverses hypoxia
Dosage:	Breathing pt: Pt w/ inadequate rate/depth of respirations Nasal Cannula: 2-6 lpm= 24-44% FiO ₂ BVM: 10-15 lpm w/ O ₂ = 90-100% FiO ₂ Non-Rebreather: 10-15 lpm= 90-100% FiO ₂
Route:	Nasal Cannula, Face Mask, Non-Rebreather, BVM

*Reminders:

- **Ventilate 10 breath/min w/500-600cc tidal volume for pts being ventilated with BVM; same for intubated pt.**
- **Not routinely given in CVA unless needed for resp. distress**
- **DO NOT hyperventilate. It can worsen the outcome of cardiac arrest by increasing intrathoracic pressure and reducing cardiac output.**

EPINEPHRINE

Classification:	Adrenergic (sympathetic) stimulator, vasoconstrictor
Indications:	Cardiac Arrest Symptomatic bradycardia refractory to atropine, transcutaneous pacing or dopamine
Actions:	Positive β effects (increased heart rate, myocardial contractility and automaticity) Positive α effects (peripheral vasoconstriction)
Dosage:	IVP 1mg IV q3-5 minutes (or q2-4min to coincide w/rhythm checks) Infusion: Mix 2mg/ 500cc D5W or NS- Infuse 2-10μg/min
Route:	IV push, IV Infusion
Adverse Effects:	Tachycardia, Hypertension, PVC's, Palpitations Increased myocardial O ₂ demand

ATROPINE

Classification:	Parasympatholytic (blocks acetylcholine from parasympathetic nervous system)
Indications:	Symptomatic bradycardia
Actions:	Increases heart rate Increases conduction through AV node
Dosage:	1 mg IVP, Repeat at 5 min intervals, NOT TO EXCEED 3 mg
Route:	IV or IO
Adverse Effects:	Tachycardia, Dilated pupils, Angina, lower doses-bradycardia

It's now indicated to try Atropine in 2^o Type II of 3^o blocks (bradycardic) while awaiting pacer if pacer fails to capture.

LIDOCAINE

Xylocaine

Classification:	Antidysrhythmic
Indications:	Ventricular Fibrillation, Pulseless Ventricular Tachycardia Ventricular Tachycardia Premature Ventricular Complexes (PVC's) secondary to Amiodarone
Actions:	Depresses ventricular irritability and automaticity Increases fibrillation threshold
Dosage:	V-Tach with a pulse= 1mg/kg IVP (CONSCIOUS) VF & Pulseless VT= 1-1.5mg/kg. Repeat at 0.5-0.75mg/kg for subsequent doses in arrest. MAINTENANCE INFUSION upon ROSC: 2gm/500cc D5W= 4mg/cc. Infuse at 1-4mg/min (30-50 ug/kg/hr)
Route:	IVP, IO or IV Infusion
Adverse Effects:	Muscle tremors, Paresthesia, CNS symptoms- seizures

*** May cause arrest in bradycardias.**

*** Do not give for idioventricular or 3^o blocks**

ADENOCARD

(Adenosine)

Classification:	Antidysrhythmic
Indications:	Supraventricular tachycardia Stable atrial tachycardia
Actions:	Abolishes reentry, Slows AV conduction
Dosage:	6mg IVP rapidly , followed by RAPID saline flush May be repeated at 12 mg rapid IV (6mg-12mg)
Route:	IV push- rapid with immediate flush
Adverse Effects:	Transient reentry dysrhythmias, Chest pain, Palpitations Flushing, Headache

***Adenosine has 5-10 second half life.**

***Pt should be supine and forewarned of effects!**

AMIODARONE

Classification:	Antidysrhythmic
Indications:	After defibrillation and pressor in cardiac arrest with persistent VT or VF (IIb) Ventricular rate control of rapid atrial arrhythmias in pts with severe LV dysfunction (IIb) Control of thermodynamically stable VT, polymorphic VT or wide complex tachycardia or unknown origin (IIb) Adjunct to cardioversion in SVT (IIa), Atrial Tach (IIb) Pharmacological conversion of atrial fib (IIb)
Actions:	Prolongs the recovery period of cardiac cells after they have carried an impulse Effects of Na, K, Ca channels Also has α and β blocking properties Has greater efficacy and lower incidence of pro-arrhythmic properties than other drugs in pts with severely impaired heart function.
Dosage:	VF/VT= Cardiac arrest: 300mg IVP, then 150mg IVP 2nd dose (between shocks and vasoconstrictors such as epi/vaso) Upon ROSC: 150mg IVP mixed in 50 mL bag of 5% Dextrose over 10 min (bolus, can be repeated) followed by infusion: 1mg/min X 6 hours and 0.5mg/min for 18 hours.
Route:	IV/IO
Adverse Effects:	Hypotension Bradycardia (to minimize- slow drug infusion) Sinus bradycardia, Atrio-ventricular block, CHF Ventricular pro-arrhythmias
Adverse Effects:	Marked sinus bradycardia due to severe sinus node dysfunction, 2 ^o or 3 ^o AV block syncope caused by bradycardia (except when used with pacemaker), Cardiogenic shock

CARDIZEM

Diltiazem HCl

Classification:	Antidysrhythmic (Ca channel antagonist)
Indications:	Supraventricular tachydysrhythmias, (A-Fib, A-Flutter)
Actions:	Ca Channel antagonist, Slows conduction Smooth muscle dilation
Dosage:	0.25mg/kg mg over 2 minutes , may repeat with 25mg IVP slowly in 15 minutes if needed (Dose is .25mg/kg) Infusion: mix 1:1. Infuse at 5-15mg/hr
Route:	IV push slowly, IV infusion
Adverse Effects:	Bradycardia Hypotension (can be reversed with Ca administration)

***INCOMPATIBLE WITH LASIX**

MAGNESIUM SULFATE

Classification:	Antidysrhythmias (electrolyte) (Reverses hypomagnesemia seen post MI or as the cause of ectopy)
Indications:	Refractory ventricular dysrhythmias Torsades de Pointes Eclampsia
Actions:	Stabilizes tissue membranes Elevates Mg levels
Dosage:	CARDIAC ARREST DUE TO TORSADES OR HYPOMAGNESEMIA: 1-2g (2-4cc of a 50% solution) diluted in 10mL of D5W IV/IO over 5-20 min Torsades w/pulse or AMI w/hypomagesemia: loading dose of 1 to 2g mixed in 50-100mL of D5W over 5-60 minutes IV.
Route:	IV push IV infusion
Adverse Effects:	Mild bradycardia Hypotension

***OD: DIARRHEA, CIRCULATORY COLLAPSE, PARALYSIS**

SODIUM BICARBONATE

Classification:	Alkalinizer, Buffer
Indications:	Metabolic acidosis from an unknown cause or prolonged down time; suspected acidosis. NO ABG confirmation needed! Tricyclic antidepressant overdose Hyperkalemia
Actions:	Increases and stabilizes pH, Reverses acidosis
Dosage:	1mEq/kg IV push , can be repeated as ordered by clinician in cardiac arrest
Route:	IV/IO/central line

***May be given as slow infusion in overdoses where bicarb is indicated.**

CALCIUM (Calcium Chloride/Calcium Gluconate)

Classification:	Calcium ion (electrolyte)
Indications:	Known or suspected hyperkalemia (eg, renal failure) Ionized Hypocalcemia (e.g. after multiple blood transfusions) Calcium channel blocker overdose
Actions:	Increased inotropic effect Increased automaticity
Dosage:	500mg to 1000mg (5 to 10 mL of a 10% solution) IV for hyperkalemia and calcium channel blocker overdose. May be repeated as needed.
Route:	IV push
Adverse Effects:	Hypercalcemia, VF Exacerbates digitalis toxicity

DO NOT USE CALCIUM ROUTINELY IN CARDIAC ARREST; DO NOT MIX WITH SODIUM BICARBONATE

DOPAMINE

Classification:	Adrenergic stimulator (sympathetic nervous system) Used as a vasopressor upon return of ROSC post arrest.
Indications:	Symptomatic hypotension Refractory bradycardia
Actions:	Dopaminergic effects (1-2 μ g/kg/min): dilation of renal and mesenteric arteries Beta effects (5-10 μ g/kg/min): primarily increased heart rate & force Alpha effects: (10-20 μ g/kg/min): peripheral vasoconstriction increasing afterload
Dosage:	“Usual infusion rate is 5-20μg/kg/min” (ECC, 2020) *Usual cardiac dose starting at 5 μ g/kg/min Pre-Mixed 400mg/250cc D5W= (1600 μ g) INITIAL DRIP RATE: 10% OF PTS WEIGHT IN POUNDS, This method = 5 μ g/kg/min
Route:	IV infusion ONLY and titrate to a systolic BP of 90mm Hg
Adverse Effects:	Chest pain, tachycardia, Tachydysrhythmias, PVC's

NOREPINEPHRINE (Levophed)

Classification:	Adrenergic stimulator Vasopressor
Indications:	Hypotension refractory to Dopamine (systolic BP <70mm Hg)
Actions:	Primarily alpha effects causing increased systemic vascular resistance through vasoconstriction
Dosage:	Mix 4mg/250cc D5W or D5NS (not NS alone)16 μ g/cc Begin infusion at 0.5- 1.0μg/min (2-4cc/hr) and titrate to desired BP. Do not run into line with alkaline solutions.
Route:	IV infusion only
Adverse Effects:	Increases myocardial O2 requirements as it raises blood pressure and heart rate May cause arrhythmias MONITOR CARDIAC OUTPUT

MORPHINE

Classification:	Narcotic analgesic
Indications:	Ischemic chest pain Pulmonary edema Severe pain
Actions:	Potent analgesic Promotes venous pooling causing a decrease in preload Reduces anxiety
Dosage:	2-4mg increments
Route:	IV push slowly
Adverse Effects:	Respiratory depression Hypotension, Nausea

ASPIRIN

Classification:	Anticoagulant Antipyretic Analgesic
Indications:	Acute MI Unstable angina
Actions:	Blocks formation of thromboxin A2 which is responsible for platelet aggregation and vasoconstriction, thus keeping platelets from becoming lodged in partially occluded coronary vessels
Dosage:	160-325mg chewable tablets (chewable baby aspirin)
Route:	P.O.
Adverse Effects:	Contraindicated in pts with active ulcer disease, asthma or pts with known hypersensitivity to aspirin

FLORIDA HEART ACLS 2020 STUDY GUIDE

1. Identify this rhythm and consider treatments: *Review Tachycardia algorithm*



- a. Polymorphic VT
 - b. V fib
 - c. Monomorphic VT
2. A 51 year old with symptoms of stroke that started over an hour ago, and has a normal CT scan should be considered for what treatment? *See approach to stroke care in the stroke section of your textbook.*
- a. Administer aspirin
 - b. Fibrinolytics and possible Endovascular therapy (EVT)
 - c. Repeat the CT
3. In an unresponsive patient, what indicates the patient is in cardiac arrest? *See VF/PVT algorithm in your textbook.*
- a. Weak rapid pulse
 - b. Blue lips
 - c. Agonal gasping
4. Targeted temperature management (TTM) is the treatment for post cardiac rest care in the unresponsive patient and is applied for at least ____ hours. *See adult post cardiac arrest care in your textbook.*
5. After finding an adult patient unresponsive, what is the next step in your assessment? *See BLS assessment in your textbook.*
- a. Check for medications
 - b. Open the airway
 - c. Check the breathing and pulse
6. An elderly man presents in Ventricular tachycardia, with a low blood pressure and severe chest pain. SaO₂ is 85%. He is pale and sweaty. What is your initial treatment? *See preventing arrest/acute coronary syndromes in your textbook.*
- a. Synchronized cardioversion
 - b. Perform CPR
 - c. Transfer to ICU immediately

7. While caring for a patient with chest pain he suddenly becomes unresponsive and ventricular fibrillation appears on the monitor. *What should you do immediately?*
See adult cardiac arrest algorithm in your student text.
 - a. Get an IV line
 - b. Provide breathing
 - c. Start high quality CPR
8. Your first drug to consider in sudden cardiac arrest is:
See adult cardiac arrest algorithm
 - a. Mag sulfate
 - b. Amiodarone 300 mg
 - c. Epi 1 mg
9. A patient in unstable VT suddenly goes into V-fib. What intervention could have been performed to avoid this?
Review unstable tachycardias
 - a. Have the patient perform vagal maneuvers
 - b. Perform synchronized cardioversion
 - c. Provide high flow oxygen
10. You have defibrillated your V-fib patient, administered EPI 1mg, shocked a second time, and are now considering an anti-arrhythmic. Which choice is appropriate? *See adult cardiac arrest algorithm*
 - a. Amiodarone 1mg per minute
 - b. Lidocaine 1-1.5mg/kg IV push
 - c. Procainamide
11. You are a provider in a cardiac arrest, and the team leader asks you to start an IV, which is not in your scope of practice. What should you do? *Review Team Dynamics*
 - a. Start the IV anyway
 - b. Ask the person next to you to start it.
 - c. Ask for a new role
12. What is the best way to assess the quality of CPR in your patient who is in cardiac arrest and has been intubated? *See end tidal CO2 monitoring*
 - a. Obtain a 12 Lead EKG
 - b. Monitor the patient's PETCO2
 - c. Watch for good chest recoil

13. The following rhythm is a _____ heart block. When treating, follow your Bradycardia algorithm. *See Rhythms for Bradycardia*



- a. First degree
 - b. Third degree
 - c. 2nd degree type II
14. What are the first and second doses of Adenosine/Adenocard in Stable SVT? *Review stable tachycardia*
- a. 12 then 15
 - b. 6 then 12
 - c. 12 then repeat 12
15. Why are rapid response teams so valuable? *See RRTs and METs*
- a. Improving the outcome by identifying clinical deterioration of the patient
 - b. They are great at getting vascular access
 - c. They quickly move the patient to the ICU
16. In Acute Coronary Syndromes, what is the dose of aspirin? *Review acute coronary syndromes*
- a. 81mg
 - b. 300mg
 - c. 160-325mg
17. In the post cardiac arrest period, we should attempt to maintain a BP of at least: *Review post cardiac arrest care.*
- a. 80mmHg
 - b. 85mmHg
 - c. 90mmHg
18. A 71 year old man presents with the following rhythm. He is nauseous, sweaty, and has a weak radial pulse. What algorithm should you follow to treat this patient? *Review tachycardia algorithm, stable vs unstable.*



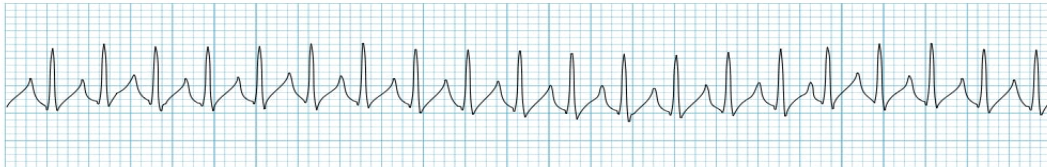
- a. Adult stroke
- b. Acute coronary syndrome
- c. Adult tachycardia with a pulse

19. The previous patient has crushing chest pain. What intervention should be considered first? *Review Stable/Unstable tachycardias*
- Aspirin
 - Synchronized cardioversion
 - Adenosine 6mg
20. The team leader directs you to administer 300mg of Amiodarone in a cardiac arrest. Your response should be: *See: High performance team roles*
- “OK”
 - “I’ll administer 300mg Amiodarone”
 - “Why are we giving that?”
21. What happens when you ventilate a patient excessively? *See Respiratory arrest*
- Increased venous return
 - Decreased intrathoracic pressure
 - Decreased cardiac output
22. If a patient in cardiac arrest showing V-fib or Pulseless V Tach, what is your first dose of Amiodarone?
- 1mg/kg
 - 300mg
 - 150mg
23. If a patient suddenly becomes unresponsive and you see the following rhythm, what is the appropriate treatment after starting CPR? *Review V-fib/PVT algorithm*



- EPI 1mg
 - Check pulse
 - Defibrillation
24. The rate for chest compressions on adults, children and infants is:
See the BLS assessment
- 80-100 per minute
 - 120 per minute
 - 100-120 per minute

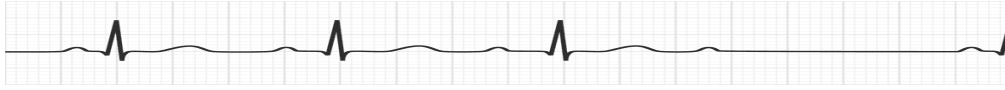
25. You are ventilating a patient in respiratory arrest with a pulse. How many breaths per minute do you administer? *See BLS assessment with pulse*
- Once every 10 seconds
 - Once every 6 seconds
 - Once every 12 seconds
26. What temperature is the recommended range for Targeted Temperature Management in the post cardiac arrest care algorithm? *Review post cardiac arrest care*
- 35-40 degrees Celsius
 - 30-34 degrees Celsius
 - 32-36 degrees Celsius
27. The following rhythm is _____, and the BP is 68/50. The patient is short of breath and extremely anxious. Your treatment should be: *Review tachycardias*



- V-Tach, Amiodarone drip
 - Supraventricular Tachycardia (SVT), synchronized cardioversion
 - A-Fib, Cardizem
28. What is the priority for a patient who is exhibiting signs and symptoms of stroke? *See Acute Stroke algorithm*
- CPR
 - 12 Lead
 - Non contrast CT of head
29. The size of an oropharyngeal airway may established by: *Review Basic Airway Adjuncts*
- Measure from the nose to the angle of the jaw
 - Measure from the corner of the mouth to the angle of the jaw
 - Ask the respiratory therapist
30. What should we do IMMEDIATELY after a defibrillation attempt? *Review BLS*
- Check the pulse
 - Check the EKG Monitor
 - Immediately resume chest compressions

31. A patient with chest discomfort, HR of 90, and BP of 100/52 is in your care. His SaO₂ is 97%. What is your next step? *Review Acute Coronary Syndromes*
- Obtaining a chest X-ray
 - Draw labs
 - Get a 12 Lead EKG within the first 10 minutes

32. What is the following rhythm? *See Blocks in Bradycardia case*



- First degree block
 - 3rd degree block
 - 2nd Degree Type I (Wenkebach)
33. Despite defibrillation attempts, your patient remains in ventricular fibrillation. What is always the first drug to administer in V-fib? *See Adult cardiac arrest, V-fib/PVT*
- Amiodarone 300mg
 - EPI 1mg
 - Atropine 0.5mg
34. You have resuscitated the patient. The patient appears comatose. What is your next intervention? *See Post arrest care*
- Hang a Dopamine drip
 - Intubate the patient
 - Initiate Targeted Temperature Management
35. One method of increasing Chest Compression Fraction (CCF) during a code is: *Review High Performance Teams Critical Concepts*
- Insert an IO needle early
 - Charge the defibrillator 15 seconds before the rhythm check
 - Increase the speed of your compressions
36. The most reliable method to monitor and confirm endotracheal tube placement is: *See Airway management in Cardiac arrest*
- SaO₂
 - ABG
 - Continuous waveform capnography

37. Capnography during chest compressions continues, and pt is intubated. Capnography is 9mmHg. What does this finding indicate?
- Your compressions are effective
 - You should terminate your CPR
 - Chest compressions may not be effective
38. A team member is about to give the wrong drug dose during a code. What should the Team Leader do? *Review Effective Team Dynamics*
- Talk about it later
 - Ask the team member to step out of the room
 - Address the situation immediately with the team member
39. What type of block is the following rhythm? *See Bradycardia/Blocks algorithm*



- 2nd Degree Type 1, Wenkebach
 - 2nd Degree Type 2, Mobitz 2
 - 3rd Degree Heart Block, Complete Block
40. A very chaotic, noisy code is running in the ER. There are too many people in the room. The team member in charge of meds thinks she heard an order for 400mg of Amiodarone. What should the team member do?
- Don't question the doctor, just give the drug!
 - "I have an order for 400mg of Amiodarone. Is that correct?"
 - Ask if you should give 150mg instead
41. After 2 minutes of CPR, the following rhythm is seen on the monitor: THERE IS NO PULSE!



What is your next appropriate action? *Review Managing Asystole/PEA*

- Resume CPR and give 1mg EPI
- Start Dopamine 2-10ug/kg/min
- Pace the patient

42. What is the job of the CPR coach during a resuscitation? *Look at High Performance Teams*
- To make sure staff switches every two minutes
 - To work the monitor between compression cycles
 - To ensure that high quality CPR is delivered during the code
43. A patient has chest pain and an oxygen saturation of 83% on room air. What intervention should you consider? *Review unstable tachycardia/treating underlying causes*
- Intubation
 - Reposition the pulse oximeter to a different finger
 - Give oxygen and titrate to >94%.
44. A patient in V-Tach with a pulse becomes unresponsive and pulseless. What is the highest priority? *Review Adult Cardiac Arrest Algorithm*
- EPI
 - Amiodarone
 - Defibrillation
45. What can the Team Leader do during the code to limit inefficiencies in the Team's performance? *See Team Dynamics*
- Only the most experienced members to handle tasks
 - Clearly delegate tasks to each team member
 - Do everything himself
46. In the BLS Primary Assessment, how long should you check for breathing and pulse? *Review BLS Assessment*
- 5-10 seconds
 - 10-15 seconds
 - As long as it takes
47. EMS is able to resuscitate a cardiac arrest victim in the field. (ROSC). Where should this patient be taken? *See Multiple System approach to Post-Cardiac Arrest Care*
- The nearest ER
 - A Trauma and Stroke Center
 - Coronary reperfusion-capable medical center
48. Time is muscle in the STEMI patient. What is the maximum time from first medical contact to balloon inflation time for PCI? *Study the Acute Coronary Syndromes Algorithm*
- 60 minutes
 - 90 minutes
 - 180 minutes

49. Rescuers should NEVER stop chest compressions for more than _____seconds. *Review BLS*
- a. 5
 - b. 10
 - c. 15
50. EMS Providers transporting a suspected stroke alert should be sure to: *See acute stroke*
- a. Treat hypertension
 - b. Provide Prehospital notification
 - c. Get the patient's home phone number

H's and T's in ACLS: Treating reversible causes of cardiac arrest

Hypovolemia-*FLUIDS*, usually wide open in PEA and ASYSTOLE

Hypoxia-*Suction needed? OPA, NPA needed?* Hard to ventilate?

INTUBATE

Hydrogen ion (acidosis) Might be based on "down time" or confirmed acidosis *1MEq/KG BICARB*

Hypo/hyperkalemia- *Dialysis patient?*

Confirmed via labs? High: Insulin administered with glucose. Low: Rapid, controlled infusion of potassium

Hypothermia-Has the patient been hypothermic before the arrest?

WARM THE PATIENT

Tension Pneumothorax-Check lung sounds during ventilation? Pneumo?

Not moving air? *INTUBATE or DECOMPRESS*

Tamponade, cardiac-*IMMEDIATE ASPIRATION*

Toxins-history of pain meds? Possible OD? *NARCAN*

Thrombosis, pulmonary-*PRAY*

Thrombosis, coronary-*if resuscitated send to CATH LAB*

Post Resuscitation Care

Upon return of spontaneous circulation, several goals of care should be addressed. Assess the patient's heart rate, EKG rhythm, blood pressure, peripheral pulses and consider an antiarrhythmic and/or pressor agent to maintain adequate perfusion. 1-2 liters of fluid is the range of post resuscitation care, while carefully checking lung sounds. According to the AHA, all patients who have been successfully resuscitated should be considered for Targeted Temperature Management (TTM) with a goal of 32-36* Celsius for a full 24 hours. (considered to be the only intervention that improves neurologic function). A 12 lead EKG that shows ST elevation may be considered for immediate treatment in the cath lab, while cooling is ongoing. A full set of labs and troponins are expected at this time.

In the "To 10 take home messages for Adult Cardiovascular Life Support", published in Circulation, 2020, there are several excellent suggestions:

- ♥ Upon recognition of cardiac arrest a layperson should simultaneously and promptly activate EMS and initiate CPR. The CPR should include adequate compression depth and rate while minimizing pauses in compressions.
- ♥ Early defibrillation with concurrent high-quality CPR is critical to survival when sudden cardiac arrest is caused by V-fib or Pulseless V-Tach.
- ♥ Administration of EPI with concurrent high-quality CPR improves survival, particularly in patients with non-shockable rhythms.
- ♥ Recognizing that all cardiac arrest events are not identical is critical for optimal patient outcome, and specialized management is necessary for many conditions (e.g. Electrolyte abnormalities, pregnancy and after cardiac surgery).
- ♥ The opioid epidemic has resulted in an increase in opioid-associated out-of-hospital cardiac arrest, with the mainstay of care remaining the activation of EMS and performing CPR.
- ♥ Post cardiac arrest care is a critical component of the Chain of Survival and demands a comprehensive, structured, multidisciplinary system that requires consistent implementation for optimal patient outcomes.
- ♥ Prompt initiation of targeted temperature management is necessary for ALL patients who do not follow commands after return of ROSC to ensure optimal functional and neurological outcome.
- ♥ Accurate neurological prognostication in brain-injured cardiac arrest survivors is critically important to ensure that patients with significant potential for recovery are not destined for certain poor outcomes due to care withdrawal.
- ♥ Recovery expectations and survivorship plans that address treatment, surveillance, and rehabilitation need to be provided to cardiac arrest survivors and their caregivers at hospital discharge to optimize transitions of care to home and to the outpatient setting.

P2Y Inhibitors

Platelet adhesion, activation and aggregation play a pivotal role in atherothrombosis. Intracoronary atherothrombosis is the most common cause of the development of acute coronary syndrome, also called ACS. They also play a central role in complications occurring around percutaneous coronary intervention (PCI). This includes recurrent ACS, procedure-related myocardial infarction or stent thrombosis. Inhibition of platelet aggregation with medical treatment impairs formation and progression of thrombotic processes and is therefore of great importance in the prevention of complications after acute coronary syndrome or around PCI.

An essential component of in platelet activation process is the interaction of adenosine diphosphate (ADP) with the platelet P2Y 12 receptor. This is the predominant receptor in the ADP-stimulated activation of the glycoprotein IIb/IIIa receptor. Activation of the glycoprotein IIb/IIIa receptor results in enhanced platelet degranulation and thromboxane production, and prolonged platelet aggregation.

P2Y 12 receptor blockers as anti-platelet drugs include clopidogrel (**Plavix**), ticlopidine (**Ticlid**), ticagrelor (**Brilinta**) prasugrel (**Effient**) and cangrelor (**Kengreal**).

Kengreal: specifically designed as an adjunct to PCI (cath lab); >98% inhibition of platelet aggregation with rapid onset within 2 minutes; average elimination half-life of 3-6 minutes; rapid offset within 1 hour after discontinuation (depending on hepatic function)

Brilinta: Indicated to reduce risk of thrombotic CV events and stent thrombosis in patients with ACS who have been stented. (since 2016 Plavix is no longer indicated for STEMI patients who are managed with PCI). Brilinta is not restricted by pt age/weight; medical or invasive mgmt., prior TIA/ischemic stroke.

Ticlid: as adjunctive therapy with aspirin to reduce the incidence of subacute stent thrombosis in patients undergoing successful coronary stent implantation. Dosing: Coronary Artery Stenting: The recommended dose of TICLID (ticlopidine hcl) is 250 mg bid taken with food together with antiplatelet doses of aspirin for up to 30 days of therapy following successful stent implantation.

Effient: Effient is used in people who've had a balloon angioplasty to open blocked arteries after having a heart attack or severe chest pain. To reduce the rate of thrombotic cardiovascular events (including stent thrombosis) in patients with acute coronary syndrome (ACS) who are to be managed with PCI for unstable angina (UA), non-ST segment elevation myocardial infarction (NSTEMI), or ST segment elevation myocardial infarction (STEMI).

-No clear benefit was observed when the loading dose of this drug was administered

prior to diagnostic coronary angiography compared to at the time of percutaneous coronary intervention (PCI); however, risk of bleeding was increased with early administration in patients undergoing PCI or early coronary artery bypass graft surgery (CABG).

-Aspirin 75 to 325 mg daily should be taken with this drug.

Plavix: An anticoagulant indicated for ST segment elevation (STEMI), High risk ST depression or T wave inversion, pts with planned PCI, and as an antiplatelet therapy in patients who cannot take aspirin. Plavix blocks ADP which inhibits glycoprotein and the effectiveness of the clotting process. Dosage is 300mg initially followed by 75 mg PO daily. May alter for the elderly. Use caution in pts with HX of bleeding and active bleeding; impaired hepatic function.

Beta blockers

Beta blockers such as Metoprolol (succinate), Sotalol and Esmolol are useful as beta adrenergic blockers and are indicated for secondary management of ACS after the patient is stable. They decrease heart rate, stroke volume, automaticity and conductivity. Doses are as follows:

Metoprolol (Lopressor) 5mg; may repeat in 5 minutes to max of 15mg

Sotalol (Betapace) 100mg over 5 minutes for V-tach.

Esmolol (Breviblock) loading dose of 500ug/kg over 1 minute, then maintenance of 50ug/kg over 4 minutes. May increase if unsuccessful.

**Per AHA guidelines, only Toprol, Coreg and Bisoprolol are approved B-Blockers. They are recommended because of the 24-hour half-life and will help decrease O₂ consumption in the heart.*