



Advanced Cardiac Life Support

Workbook

RULES FOR ACLS

1. ALL LIVE (CARDIAC) PTS GET 12 LEAD EKG FIRST
2. THEN FIX OXYGEN IF LESS THAN 90% TO 92-98 %
3. STABLE PT HAS BP >90 AND OR IS RESPONSIVE
4. UNSTABLE PT HAS BP<90 AND/OR IS UNRESPONSIVE
5. IF UNCONSCIOUS CHECK PULSE NO PULSE =CPR
6. VFIB-SHOCK,DRUG,SHOCK,DRUG,SHOCK DRUG
7. H&T -HYPOXIA, HYPOVOLEMIA, HYPOTHERMIA, HYPOGLYCEMIA, TOXIN, TENSION PNEUMO, PERICARDIAL TAMPONADE, TRAUMA, THROMBOSIS START WITH MOST PROBABLE

ACS ALGORITHM/CHEST PAIN

Assess and care for the patient using the primary and secondary surveys.

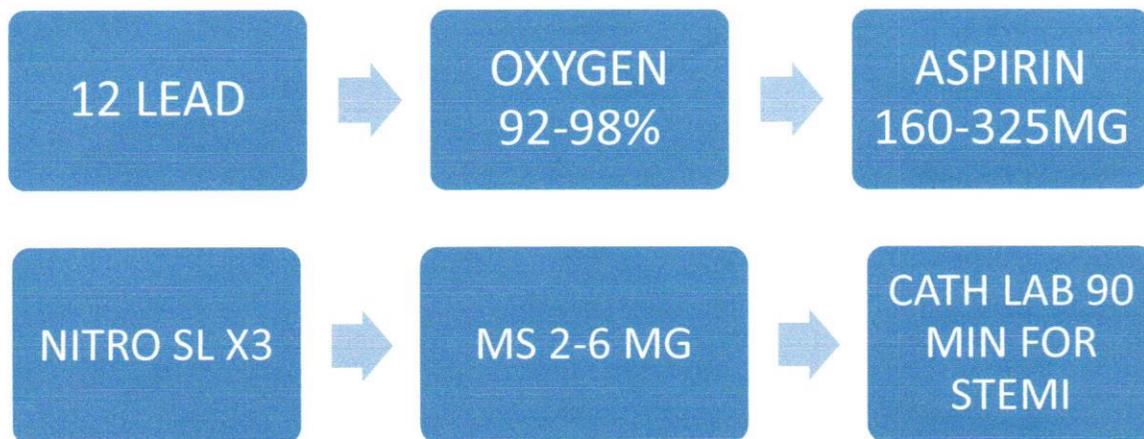
*****OBTAIN A 12 LEAD EKG*****

If the patient is infarcting it is imperative that they be transported to a facility capable of percutaneous transluminal coronary intervention if within **90 minutes**.

1. Monitor and support ABCs (airway, breathing, and circulation).
2. If the patient's pulse oximetry is less than **92** administer oxygen at a level that increases the saturation to between **92-98%**. If the patient has a history of COPD administer oxygen if their pulse ox falls below 90% on room air
3. Establish IV access.
4. If the patient did not receive aspirin from the EMS provider, give **aspirin (160 to 325 mg)**.
5. Administer **nitroglycerin 0.4mg q 5 minutes**, either sublingual, spray. Withhold Nitroglycerin on the patient who is experiencing Right Ventricular Infarction/ED meds/BP <90.
6. Give the patient a narcotic pain reliever such as Fentanyl, Morphine or Dilaudid if pain is not relieved by nitroglycerin. Morphine (2-6) is the drug of choice for infarction, but should be used with caution in the unstable angina patient.

STEMI GOES TO CATH LAB (PCI)

MONA/OANM



STROKE ALGORITHM

Identify signs of a possible stroke.

- Facial Droop (have patient show teeth or smile)
- Arm Drift (patient closes eyes and extends both arms straight out, with palms up for 10 seconds)
- Abnormal Speech (have the patient say "you can't teach an old dog new tricks")

If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%

Check blood glucose level

Prior to any treatment a Head CT must be performed. 20% of strokes are bleeds and fibrinolytics are contraindicated

EMS must transport to a facility capable of doing a CT and treating a stroke (stroke center)

STROKE



FAST-FACE -ARM- SPEECH -TIME

Stable/Unstable Tachycardia Algorithm

Does the patient have a pulse? Is the patient stable?

Look for altered mental status, ongoing chest pain, hypotension, or other signs of shock.

Remember: Rate-related symptoms are uncommon if heart rate is < 150 bpm.

Yes, the patient is stable. Take the following actions:

1. **Obtain a 12-lead ECG or rhythm strip.**
2. Start an IV.
3. Vagal maneuvers

Is the QRS complex wide or narrow?

Patient

Treatment

The patient's QRS is narrow and rhythm is regular. Try vagal maneuvers. Give **adenosine 6 mg rapid IV push**. If patient does not convert, give **adenosine 12 mg rapid IV push**.

The patient's rhythm is irregular. Control patient's rate with diltiazem (Cardizem) or beta-blockers. Use beta-blockers with caution for patients with pulmonary disease or congestive heart failure.

If the rhythm pattern is irregular narrow-complex tachycardia, it is probably atrial fibrillation, possible atrial flutter, or multi-focal atrial tachycardia.

Patient is in ventricular tachycardia *or uncertain rhythm*.

Adenosine 6 mg rapid IV push If no conversion, give adenosine 12 mg rapid IV push;. Amiodarone 150 mg IV over 10 min Prepare for elective synchronized cardioversion.

UNSTABLE TACHYCARDIA

1. Immediate cardioversion (synchronized) 100/200/300/
2. Atrial fib- 120-200
3. Sedate when pt. condition permits

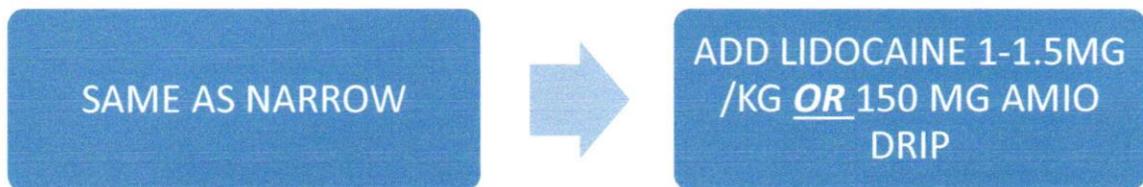
TACHYCARDIA

STABLE BP > 90 / ALERT TACHYCARDIA RATE > 150

NARROW



WIDE COMPLEX (V-TACH)



UNSTABLE TACHYCARDIA BP < 90 / UNRESPONSIVE



BRADYCARDIA

***OBTAIN 12 LEAD ***

Assess and manage the patient using the primary and secondary surveys:

1. O2 SAT between 92-98%-hypoxia causes bradycardia
2. Decide whether the patient has adequate or poor perfusion, since the treatment sequence is determined by the severity of the patient's clinical presentation.
 - If patient is stable.
 - Consider administering **atropine 1.0 mg IV** if IV access is available Repeat every 3 to 5 minutes up to 3mg or 6 doses.
 - Consider epinephrine or dopamine
 - **Epinephrine 2 to 10 µg/min**
 - **Dopamine 2 to 10 µg/kg per minute**
 - If patient is unstable, :
 - Prepare for Transcutaneous Pacing. FDo not delay pacing if no IV is present, pacing can to first

BRADYCARDIA

Heart Rate of less than 60 & SYMPTOMATIC

STABLE BP>90 /ALERT



UNSTABLE BP<90 UNRESPONSIVE

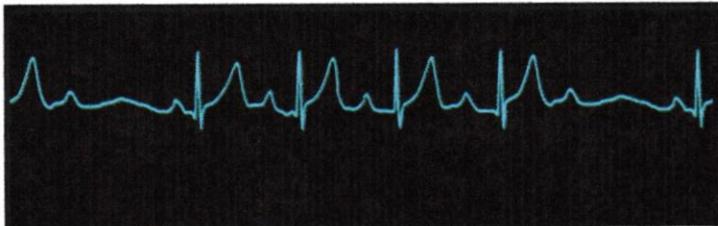
EXTERNAL
PACEMAKER

THIRD DEGREE HEART BLOCK



No relationship between P wave and QRS (Divorce)

SECOND DEGREE HEART BLOCK TYPE I

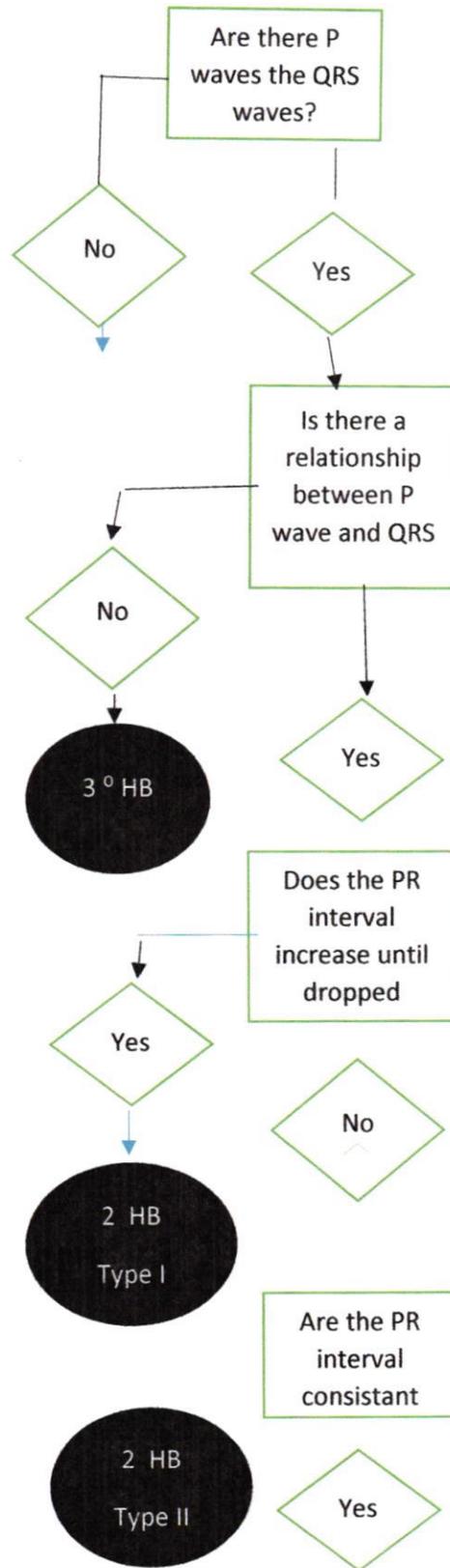


PR Interval is longer, longer, gONE Type I

SECOND DEGREE HEART BLOCK, TYPE II



PR interval is consistently TOgether, Type II



PEA/ASYSTOLE ALGORITHM

Patients with PEA have poor outcomes. Their best chance of returning to a perfusing rhythm is through the quick identification of an underlying reversible cause and correct treatment. As you use the algorithm to manage the PEA patient, remember to consider all the H's and T's, particularly hypovolemia, which is the most common cause of PEA. Also look for drug overdoses or poisonings.

Begin with the primary survey to assess the patient's condition:

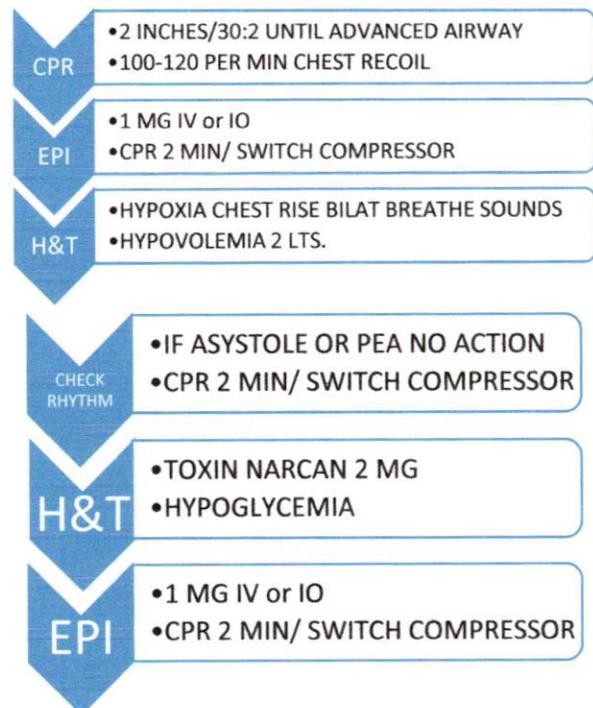
1. **Pulseless Electrical Activity (PEA) occurs when you see a rhythm on the monitor that would normally be associated with a pulse, however the patient is pulseless.**
2. The rhythm can be anything, at any heart rate
3. There is something preventing the heart from generating a pulse, such as Hypovolemia , Tamponade or another **H&T's**
4. Re-assess the patient frequently for the return of pulses

Follow the ACLS Pulseless Arrest Algorithm

ASYTOLE/PEA

(PEA-RHYTHM THAT SHOULD PRODUCE PULSE BUT DOES NOT)

1. Begin CPR as soon as pulselessness is recognized. Continue CPR at a rate of **100 to 120 per minute throughout the resuscitation without interruptions of more than 10 seconds to evaluate for pulses.**
2. Compressors should be **switched every 2 minutes to ensure efficacy of compressions**
3. **Waveform capnography should be utilized to monitor efficacy of compressions and (should generate at least 10MM/HG) and the return of pulses (will cause an increase in capnography to 40 or higher)Waveform capnography is the gold standard to verify endotracheal intubation (>0)**
4. Obtain IV/IO access. **Try ACF first -both sides then I/O**
5. Assess rhythm every 2 minutes Administer **Epinephrine 1 mg IV/IO every 3-5 minutes.**
6. Find and treat underlying causes. **Rule out H&T'S**

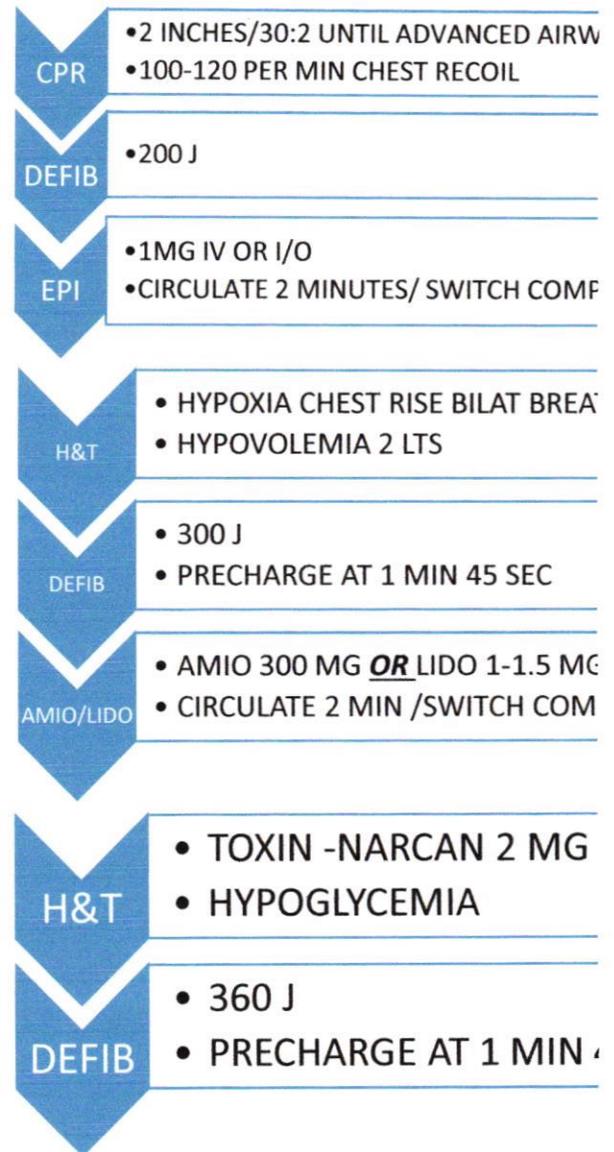


VFIB/PULSELESS V-TACH ALGORITHM

1. Begin CPR as soon as pulselessness is recognized. Continue CPR at a rate of **100 to 120 per minute throughout the resuscitation without interruptions of more than 10 seconds to evaluate for pulses.**
2. Compressors should be **switched every 2 minutes to ensure efficacy of compressions**
3. **Assess rhythm if shockable defibrillate 200 j or manufacture's recommendation**
4. **Waveform capnography should be utilized to monitor efficacy of compressions and (should generate at least 10MM/HG) and the return of pulses (will cause an increase in capnography to 40 or higher)Waveform capnography is the gold standard to verify endotracheal intubation (>0)**
5. Obtain IV/IO access. **Try ACF first -both sides then I/O**
6. Administer **Epinephrine 1 mg IV/IO during compressions followed by 20 cc flush**
7. Circulate Epi for 2 minutes while Ruling out H&T'S
8. Assess rhythm if shockable defibrillate 200 j or manufacture's recommendation
9. Give **Amio 300m mg IV/IO or Lidocaine 1mg/kg during compressions followed by 20 cc flush**
10. Circulate Amio/Lido for 2 minutes while Ruling out H&T'S
11. Assess rhythm if shockable defibrillate 200 j or manufacture's recommendation
12. Repeat process- subsequent Amiodarone doses are 150 mg.

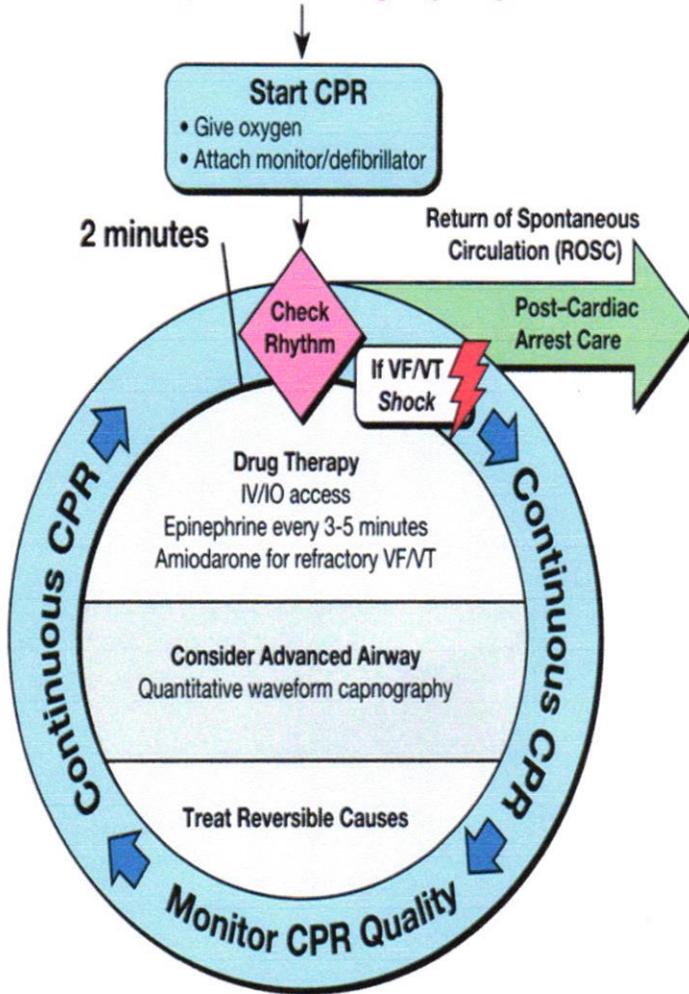
SHOCK-DRUG-SHOCK-DRUG-SHOCK-DRUG

2 MINUTES (5 CYCLES) BETWEEN DRUG AND SHOCK-
RULE OUT H&T'S



Adult Cardiac Arrest

Shout for Help/Activate Emergency Response



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CPR Quality

- Push hard (≥ 2 inches [5 cm]) and fast (≥ 100 /min) and allow complete chest recoil
- Minimize interruptions in compressions
- Avoid excessive ventilation
- Rotate compressor every 2 minutes
- If no advanced airway, 30:2 compression-ventilation ratio
- Quantitative waveform capnography
 - If $PETCO_2 < 10$ mm Hg, attempt to improve CPR quality
- Intra-arterial pressure
 - If relaxation phase (diastolic) pressure < 20 mm Hg, attempt to improve CPR quality

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Abrupt sustained increase in $PETCO_2$ (typically ≥ 40 mm Hg)
- Spontaneous arterial pressure waves with intra-arterial monitoring

Shock Energy

- **Biphasic:** Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.
- **Monophasic:** 360 J

Drug Therapy

- **Epinephrine IV/IO Dose:** 1 mg every 3-5 minutes
- **Vasopressin IV/IO Dose:** 40 units can replace first or second dose of epinephrine
- **Amiodarone IV/IO Dose:** First dose: 300 mg bolus. Second dose: 150 mg.

Advanced Airway

- Supraglottic advanced airway or endotracheal intubation
- Waveform capnography to confirm and monitor ET tube placement
- 8-10 breaths per minute with continuous chest compressions

Reversible Causes

- | | |
|---------------------------|-------------------------|
| - Hypovolemia | - Tension pneumothorax |
| - Hypoxia | - Tamponade, cardiac |
| - Hydrogen ion (acidosis) | - Toxins |
| - Hypo-/hyperkalemia | - Thrombosis, pulmonary |
| - Hypothermia | - Thrombosis, coronary |

BLS SAVES LIVES

CAB NOT ABC-CIRCULATION IS PRIORITY
 2-2.4 INCHES /100-120 COMPRESSIONS PER MINUTE/
 ALLOW COMPLETE CHEST RECOIL
 CAPNOGRAPHY CAN HELP QUANTIFY EFFECTIVENESS OF
 CHEST COMPRESSIONS LESS THAN 10 IS POOR CHEST COMPRESSIONS

IMMEDIATELY START CPR AFTER DEFIBRILLATION

ROSC -RETURN OF SPONTANEOUS CIRCULATION

WHEN YOU SEE ORGANIZED NON SHOCKABLE RHYTHM ON THE MONITOR DURING RHYTHM CHECK THEN CHECK PULSE

1. If pulse is present follow ROSC algorithm, if not it is PEA
2. Use fluids and dopamine to obtain BP >90 systolic
3. Everything is now concentrated on ventilation and oxygenation. If the pt is in respiratory arrest give 1 breath every 5-6 seconds. O2 between 92-98% Capnography between 35 -40 mm/hg
4. Over next 24 hrs. obtain Target temperature therapy between 32-36 degrees C
5. If ACS suspected do 12 lead and if STEMI send to PCI (cath lab)

ACLS PEARLS

1. Unstable Patients get electricity
2. Stable Patients get 12-Lead and Medicine
3. Dead Patients get Good, Hard, Fast CPR, Epi, and H's & T's,

Team Dynamics

Everyone must be proficient in their job or skill. If you cannot perform a skill as instructed due to lack of knowledge or if it is outside of your scope of practice inform team leader. Clarify any mistakes or possible medication errors. Repeat back instructions to avoid misunderstandings (Closed loop communications).

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