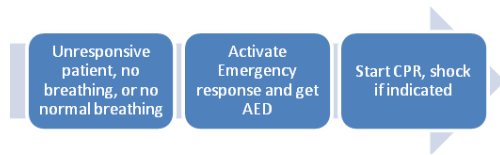


BLS Overview – CAB Compressions, Airway, Breaths



- Push hard and fast 100 to 120/min for 2 minutes
- If person unresponsive, check breathing and pulse.
- Pulse check no more than 5 to 10 seconds
- Anytime no pulse or unsure – COMPRESSIONS
- Charge defibrillator 15 seconds before rhythm check

Elements of High-Quality CPR

COMPRESSIONS

- Compressions started within 10 seconds
- Rate at least 100 to 120 per minute
- Compression depth at least 2 inches, not more than 2.4 inches or 6cm
- Switch compressors every 2 minutes or 5 cycles
- In addition to defibrillation, chest compressions should be performed immediately
- Minimize interruptions (less than 10 seconds)
- PETCO₂ reading of at least 10
- Chest Compression Fraction (CCF) above 80%

RECOIL Allow complete chest recoil after compression to allow maximum blood return to the heart

VENTILATION

- Effective breaths to make the chest rise
- 1 breath every 6 seconds (10/min)
- 30 compressions to 2 ventilations
- Avoid excessive ventilation
- Excessive ventilation can decrease cardiac output

AED

- Immediately after defibrillation resume CPR, starting with chest compressions
- Use AED/defibrillator as soon as possible
- Can compress while defibrillator is charging

Stroke

- 8 D's – Detection, Dispatch, Delivery, Door, Data Decision, Drug/Device, Disposition
- Perform validated stroke screen, severity tool
 - Facial Droop, Arm Drift, Abnormal Speech
 - Establish time for symptom onset
- Emergent noncontrast CT scan or MRI of head
 - Best practice – bypass ED go straight to imaging
- Start fibrinolytic therapy as soon as possible
- Provide prehospital notification

Acute Coronary Syndromes (ACS), STEMI

- STEMI door-to-balloon within 90 minutes or less of initial contact
- Door to needle fibrinolysis 30 minutes or less.

- Give fibrinolytics as soon as possible, consider endovascular therapy
 - Coronary reperfusion – capable medical center
 - 12-lead ECG for chest pain, epigastric pain, or rhythm change
 - Aspirin is 162 to 325 mg chewed, NTG, Morphine
 - Right ventricular MI – caution with Nitroglycerin
- Patient with stents, crushing chest pain suspect ACS

Cardiac Rhythm Strips to Interpret

- Ventricular Tachycardia (VT)
 - Stable, Unstable, Monomorphic VT
- Supraventricular Tachycardia (SVT), unstable
- Heart Blocks
 - Second-degree atrioventricular Type I
 - Second-degree atrioventricular Type II
 - Third-degree atrioventricular
- Ventricular Fibrillation (VF)
- Pulseless Electrical Activity (PEA)

Bradycardia-Heart rate below 50

Need to assess stable versus unstable

If stable . . .

- Monitor, observe, and obtain expert consultation

If unstable . . .

- Atropine 1 mg IV. Can repeat Q 3 to 5 minutes to 3 mg maximum dose of 3.0 mg (including heart blocks)
- If Atropine ineffective
 - Dopamine infusion (5-20 mcg/kg/min)
 - Epinephrine infusion (2-10 mcg/min)
 - Transcutaneous pacing

Tachycardia with a Pulse

- If unstable (wide or narrow) – go straight to synchronized cardioversion (sedate first)
- If stable narrow complex
 - Obtain 12-lead ECG
 - Vagal maneuvers
 - Adenosine 6 mg RAPID IV push, followed by 12 mg

Pulseless Rhythms - Cardiac Arrest → CPR

- Included in Primary Survey
- Shock as soon as defibrillator is available
- Continue compressions while defibrillator charging
- No oxygen blowing over chest during defibrillation
- Hands free pads allow for more rapid defibrillation

Shockable Rhythms – VF, VTach

- Push hard and fast 100 to 120/min for 2 minutes
- Oxygen, monitor, IV, fluids, glucose check
- Agonal gasps are a likely indicator of cardiac arrest
- **Defibrillation** – Biphasic 120 to 200 J, Monophasic 360 J
- Epinephrine 1 mg IV push every 3 to 5 minutes
- Amiodarone 300 mg IV push first dose, Second dose 150 mg
- Lidocaine 1-1.5 mg /kg IVP first dose, then 0.5-0.75 mg/kg

Non-Shockable Rhythms – Asystole, PEA

- Push hard and fast 100 to 120/min for 2 minutes
- Epinephrine 1 mg every 3-5 minutes
- **Synchronized Cardioversion, Consider Sedation**

Unstable VT, unstable SVT

- Patient has a pulse
- Heart rate typically 150 or above
- Use synch setting on defibrillator

Waveform Capnography in ACLS (PETCO₂)



- Capnography allows for accurate monitoring quality of CPR especially if intubated to monitor PETCO₂
- Most reliable method to confirm and monitor ETT placement
- Capnography shows a persistent waveform and a PETCO₂ of 8 mm Hg – significance chest compressions may not be effective

Treat Reversible Causes (H's and T's)

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

Return of Spontaneous Circulation (ROSC)

Post Cardiac Arrest Care

- Treat hypotension systolic BP < 90 mm Hg
- 12-lead ECG, airway, capnography
 - SpO₂ 92-98%, 10 breaths per minute
 - Targeted Temperature Management (TTM)
 - Hypothermia if DOES NOT follow verbal commands
 - **TTM at least 24 hours, 32° to 36° C**

Cardiac Arrest in Pregnancy

- CPR, defibrillation, drugs – as with cardiac arrest
- Most experienced person for intubation

- Place IV above diaphragm
- If receiving IV magnesium, stop and give calcium chloride or calcium gluconate
- BLS Guidelines – Uterus above umbilicus lateral uterine displacement, manually moving the uterus to the patient's left side to relieve pressure on vessels
- Obstetric interventions – detach fetal monitor
 - Prepare for perimortem Cesarean if no ROSC in minutes

Opioid Poisoning

- Decreased respirations and pinpoint pupils
- Decreased breathing, consider Naloxone
- No breathing – CPR, AED, Naloxone 0.4 mg to 2 mg IVP, IM, IN

Points to Ponder

- Medical Emergency Teams (MET)/ Rapid Response Teams (RRT) can improve outcome by identifying and treating early clinical deterioration
 - OPA – Oropharyngeal airway measure from corner of mouth to angle of the mandible
 - Minimal systolic blood pressure is 90 mm Hg
 - Do not suction for more than 10 seconds
 - Pulse oximeter reading low, apply oxygen
 - CPR Coach – primary focus is to ensure high-quality CPR
 - Chain of Survival – new 6th link is Recovery
- Early Recognition, EMS, High-Quality CPR, Defibrillation, Post Cardiac Arrest Care, Recovery



Team Dynamics

- Closed Loop – repeat orders, question if wrong
- Incorrect order? – address immediately
- Task out of scope? – ask for new task or role
- Clearly delegate tasks to avoid inefficiencies

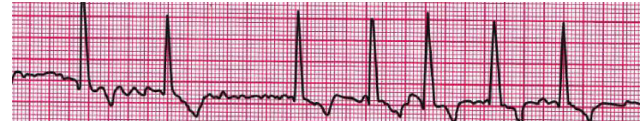
Tachycardia Rhythms with a Pulse

Stable = good BP and Alert X4 / Unstable = low BP and poor mental activity (Follow Tachycardia Algorithm)

Sinus Tachycardia



Atrial Fibrillation



Supraventricular Tachycardia



Monomorphic Ventricular Tachycardia



Atrial Flutter



Polymorphic Ventricular Tachycardia



Bradycardia Rhythms with a Pulse

Non-symptomatic = good BP and Alert X4 / Symptomatic = low BP and poor mental activity (Follow Bradycardia Algorithm)

Sinus Bradycardia



Second-degree Heart Block, Type II



First-degree Heart Block



Third-degree Heart Block



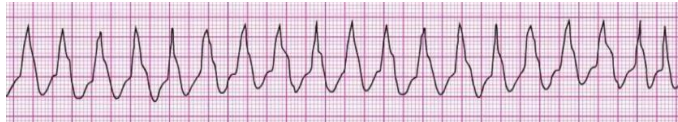
Second-degree Heart Block, Type I



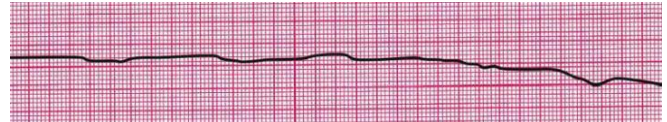
Pulseless Rhythms (Cardiac Arrest)

1st Start CPR | 2nd Shock pVT/VF Immediately | 3rd Establish IV Access & give Epi | 4th Treat Reversible Causes (H/T)

Pulseless Monomorphic Ventricular Tachycardia



Asystole



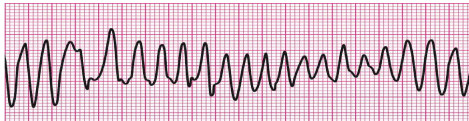
Pulseless Polymorphic Ventricular Tachycardia



Pulseless Electrical Activity--PEA



Ventricular Fibrillation



PEA is any organized rhythm without a pulse that is not VF or pVT

1. Adenosine second dose 12 mg
2. Agonal gasps most likely indicator of cardiac arrest in an unresponsive patient
3. Amiodarone 300 mg first dose then 150 mg
4. Aspirin dose 162 to 325 mg
5. Cardiac arrest with ROSC – best facility is coronary reperfusion capable medical center
6. Cardioversion synchronized – unstable VT, stable SVT
7. Chest compression fraction 80% or greater
8. Chest compression fraction can increase by charging defibrillator 15 seconds before rhythm check
9. Chest compression rate 100 to 120/minute
10. Chest compressions interruption less than 10 seconds
11. In addition to defibrillation, chest compressions should be performed immediately
12. Chest discomfort post stent then ventricular fibrillation—probable cause? Acute coronary syndrome (ACS)
13. CPR Coach focus – to ensure high quality CPR
14. Defibrillation biphasic 120 to 200 J, monophasic 360 J
15. Defibrillation next step after – resume CPR starting with chest compressions
16. Defibrillator – charge for 15 seconds before defibrillation
17. Hypothermia if does not follow verbal commands
18. Lidocaine 1 to 1.5 mg/kg first dose then 0.5 to 0.75 mg/kg
19. Medical emergency teams (MET) RRT can improve outcome by identifying and treating early clinical deterioration
20. Minimal systolic blood pressure is 90
21. OPA -measure from corner of mouth to angle of the mandible
22. PEA – epinephrine 1 mg
23. PETCO₂ – assess CPR quality
24. PETCO₂ low at 8 mm Hg – chest compressions may not be effective
25. Pulse check during BLS assessment 5 to 10 seconds
26. Pulse oximeter reading low – give oxygen
27. Pulseless rhythms – epinephrine 1 mg every 3 to 5 minutes
28. STEMI, ACS – 12-lead ECG for chest discomfort
29. STEMI, ACS – coronary perfusion-capable medical center
30. STEMI, ACS – door to balloon within 90 minutes of initial contact
31. STEMI, ACS – give fibrinolytics as soon as possible
32. Stroke – emergent noncontrast CT scan or MRI of head
33. Stroke – fibrinolytic therapy as soon as possible
34. Stroke – Prehospital notification
35. Tachycardia symptomatic with a pulse – synchronized cardioversion (sedate first)
36. Tachycardia with a pulse – adenosine 6 mg rapid IV push followed by 12 mg
37. Targeted temperature management – 32° to 36° C
38. Targeted temperature management – at least 24 hours
39. Team dynamics – clearly delegate roles
40. Team dynamics – closed loop
41. Team dynamics – incorrect order address immediately
42. Team dynamics task out of scope, ask for new task or role
43. Unresponsive patient on floor – check breathing and pulse
44. Ventilation – 1 breath every 6 seconds
45. Ventilation – excessive ventilation can decrease cardiac output
46. Ventricular fibrillation – epinephrine 1 mg IV push
47. Waveform capnography – allows for accurate monitoring quality of CPR especially if intubate
48. Waveform capnography – most reliable method to confirm and monitor ETT placement

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