



ACLS Study Guide

2012



ACLS Assessment

During the ACLS assessment, we will categorize our patient into the BLS Survey or the ACLS Survey.

BLS Survey:

*** Unconscious***

1. Check for response
2. Activate the emergency response system and get an AED
3. Check the carotid pulse
 - a. If no pulse, Start CPR
 - b. If pulse is present, start rescue breathing
4. Defibrillation

ACLS Survey:

*** Conscious***

Airway:

- Ensure a patent airway
- Use an OPA/NPA if needed
- Consider an Advanced Airway

Breathing:

- Give oxygen
- Confirm placement of advanced airway
- Monitor waveform capnography
- Avoid hyperventilation

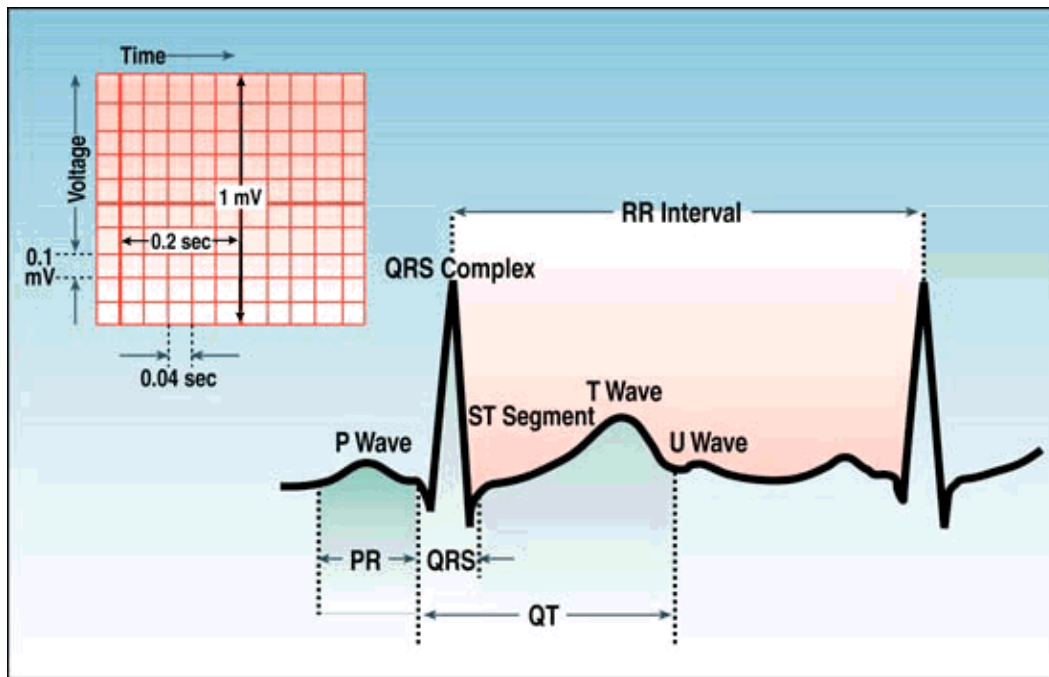
Circulation:

- Establish IV/IO access
- Identify and treat the rhythm
- Monitor CPR quality
- Defibrillation or Cardioversion

Differential Diagnosis:

- H's and T's
- Consider all reversible causes

ECG Basics



P - Atrial Depolarization

QRS- Ventricular Depolarization

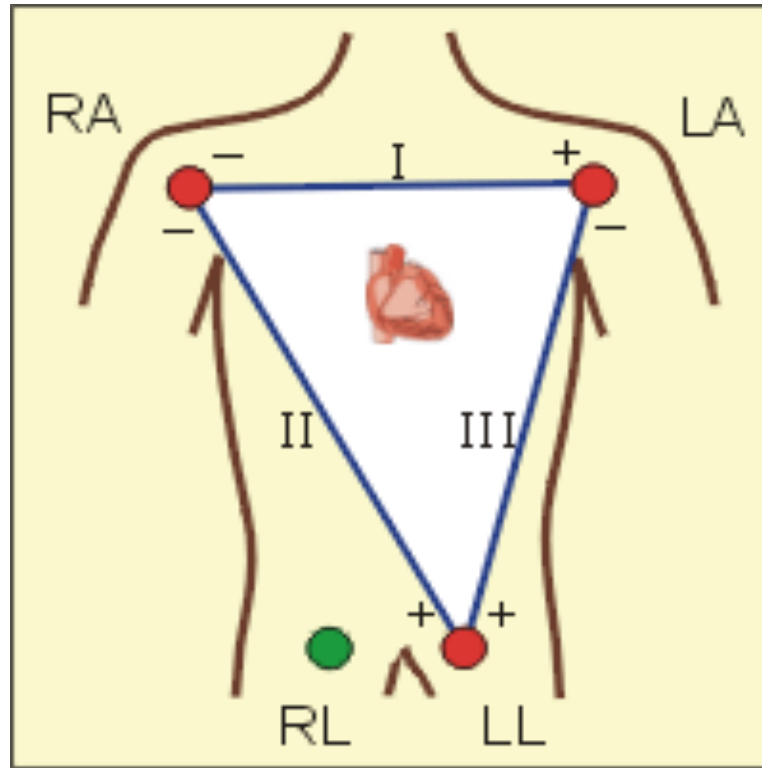
T- Ventricular Repolarization

By the Numbers

PR Interval - .12-.20

QRS Complex- < .12

ECG Lead Placement



Remember-

White- is on the right

Black- Over fire

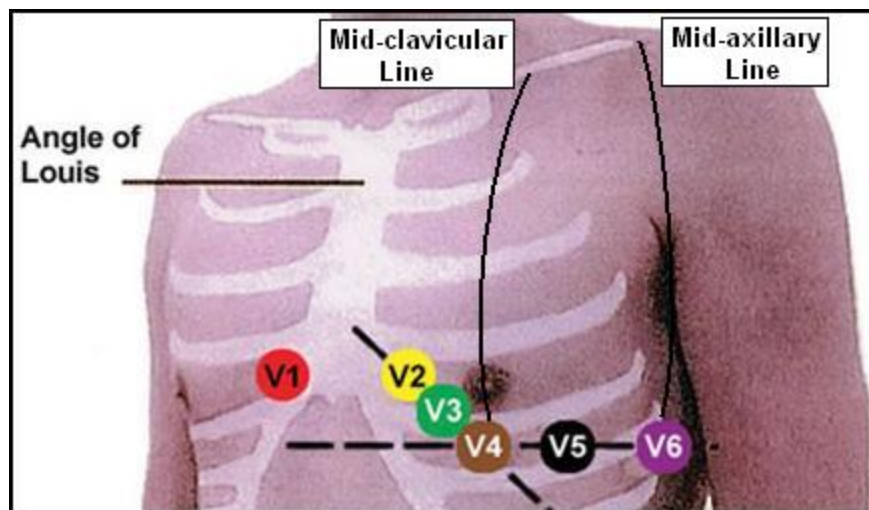
Red- Fire

Green/Brown- Always on the Right lower quadrant

12 Lead EKG

Indications for 12 Lead EKG:

- Chest Pain
- Shortness of Breath
- Syncope
- Diaphoresis
- Nausea/Vomiting
- Unexplained general weakness
- Diabetic patients
- Heart Palpitations



Placement of Precordial Leads

V₁ – 4th intercostal space, just to the right of the sternum

V₂ – 4th intercostal space, just to the left of the sternum

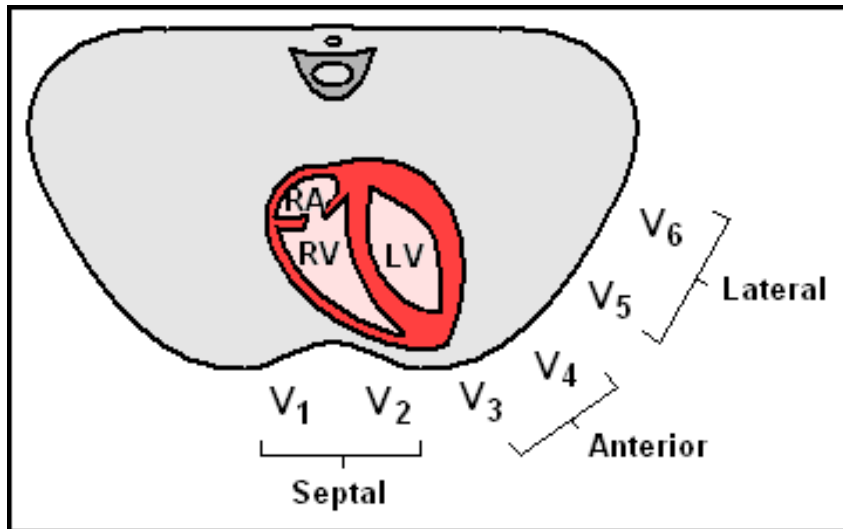
V₃ – Halfway between V₂ and V₄

V₄ – 5th intercostal space in the mid-clavicular line

V₅ – Halfway between V₄ and V₆

V₆ – 5th intercostal space in the mid-axillary line

12 Lead EKG



Each lead records the electrical activity of the heart from its own vantage point. 12 Lead EKG's will provide a detailed view of the heart

| | |
|--------|---------------|
| V1- V2 | Septal View |
| V3-V4 | Anterior View |
| V5-V6 | Lateral View |

ECG Review

Sinus Rhythms:

1. Sinus Bradycardia
2. Normal Sinus Rhythm
3. Sinus Tachycardia

Sinus Bradycardia



Description: The Sinus Node is firing at a rate below 60.

* This is normal for athletes to have resting heart rates below 60

Treatment:

Are they symptomatic?

Chest Pain

Fatigue

Dizziness

Shortness of Breath

Altered Mental Status

Hypotension

Symptomatic Bradycardia:

Atropine 0.5 mg every 3-5 mins

Max : 3 mg

Normal Sinus Rhythm



Description: Normal firing rate is 60 – 100

Sinus Tachycardia



Description: Firing rate 100-150

Common causes of Tachycardia:

| | |
|-------------|-------------|
| Fever | Anxiety |
| Sepsis | Drugs |
| Pain | Asthma |
| Hypovolemia | Hypotension |

Supraventricular Tachycardia



Description: SVT is characterized as a narrow complex rhythm with no P waves. The heart rate must be above 150 .

Treatment:

Are they symptomatic?

Chest Pain
Fatigue
Dizziness
Shortness of Breath
Altered Mental Status
Hypotension

Stable Treatment: (Medicine)

Vagal Maneuvers
Adenosine 6 mg Rapid IVP (1st Dose)
Adenosine 12 mg Rapid IVP (2nd Dose)

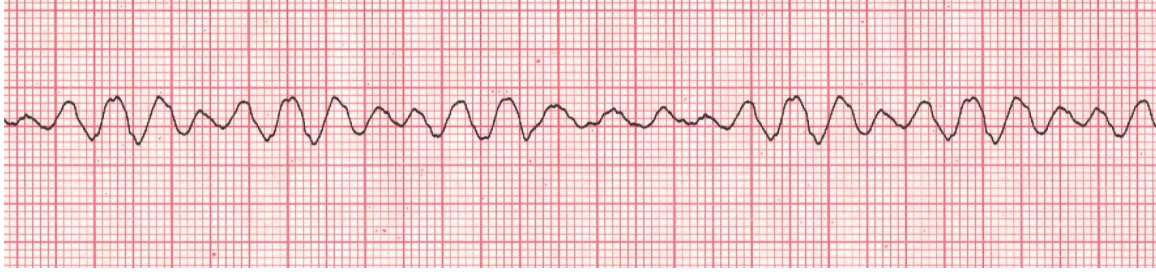
Unstable Treatment: (Edison)

Sedate if possible
Immediate Synchronized Cardioversion (100 Joules)

Pulseless Rhythms:

1. Ventricular Fibrillation
2. Ventricular Tachycardia
3. Pulseless Electrical Activity
4. Asystole

Ventricular Fibrillation



Description: Ventricular Fibrillation is a chaotic and unorganized rhythm that is unable to pump any blood. V-Fib or VF is the most common rhythm to occur during sudden cardiac arrest.

Treatment:

V-Fib gets Defib

SHOCK 200 J (Debrillation)

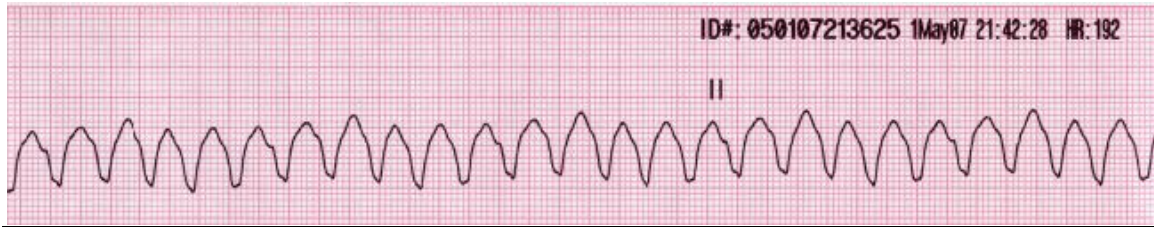


CPR (30 X 2) 2 mins



Meds (Epi 1 mg and Amiodarone 300 mg 1st/ 150 mg 2nd)

Ventricular Tachycardia



Description: Ventricular Tachycardia occurs when the ventricle takes over and generates a wide QRS complex.

CHECK FOR A PULSE

Treatment: Pulseless V- Tach

SHOCK 200 J (Debrillation)



CPR (30 X 2) 2 mins



Meds (Epi 1 mg and Amiodarone 300 mg 1st / 150 mg 2nd)

Pulseless Electrical Activity



Description: Pulseless Electrical Activity (PEA) occurs when the heart is conducting an electrical impulse however lacks a pulse.

The following rhythms can be PEA:

- Sinus Bradycardia
- Normal Sinus Rhythm
- Sinus Tachycardia

***** Remember a Rhythm without a pulse is PEA *****

Treatment: PEA

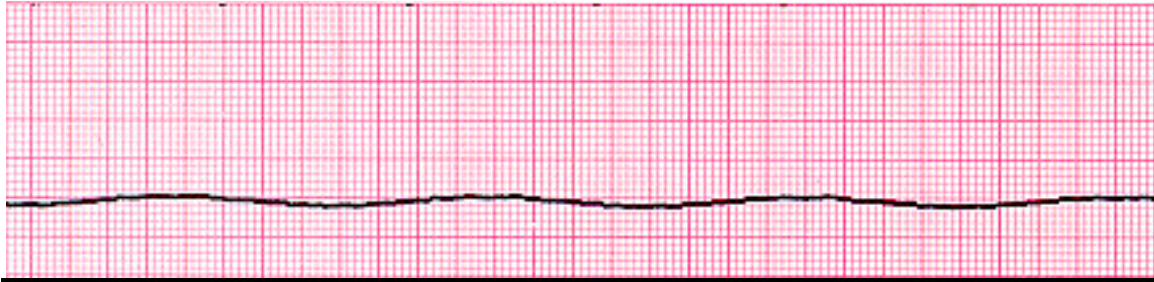
CPR (30 X 2) 2 mins



Meds (Epi 1 mg)

Consider H's and T's (Differential Diagnosis)

Asystole



Description: Asystole occurs when we have no electrical activity and non-functioning pump.

***** Ensure Leads and Defib pads are still on the patient *****

Treatment: Asystole

CPR (30 X 2) 2 mins



Meds (Epi 1 mg)

Consider H's and T's (Differential Diagnosis)

ACLS Cardiac Medications

Atropine: 0.5 mg max 3 mg

Symptomatic Bradycardia

Speed up slow rate ↑



Adenosine 6 mg 12 mg RIVP

Stable SVT

Symptomatic / HR ↑ 150

Slow down a fast rate ↓



Epinephrine 1 mg

* Give to any pulseless PT *

VF

VT

Asystole

PEA



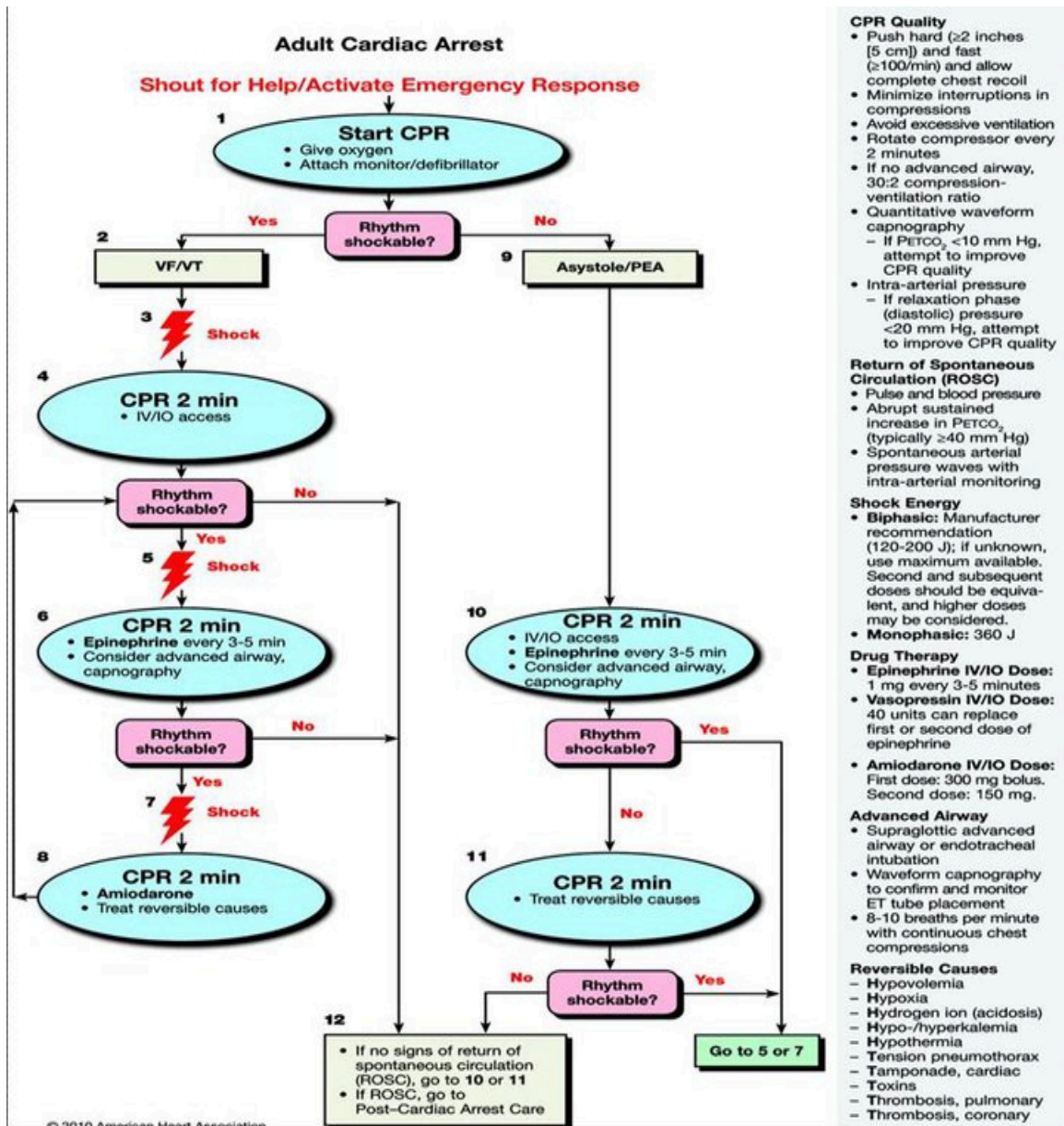
Amiodarone 300 mg/ 150 mg

VF

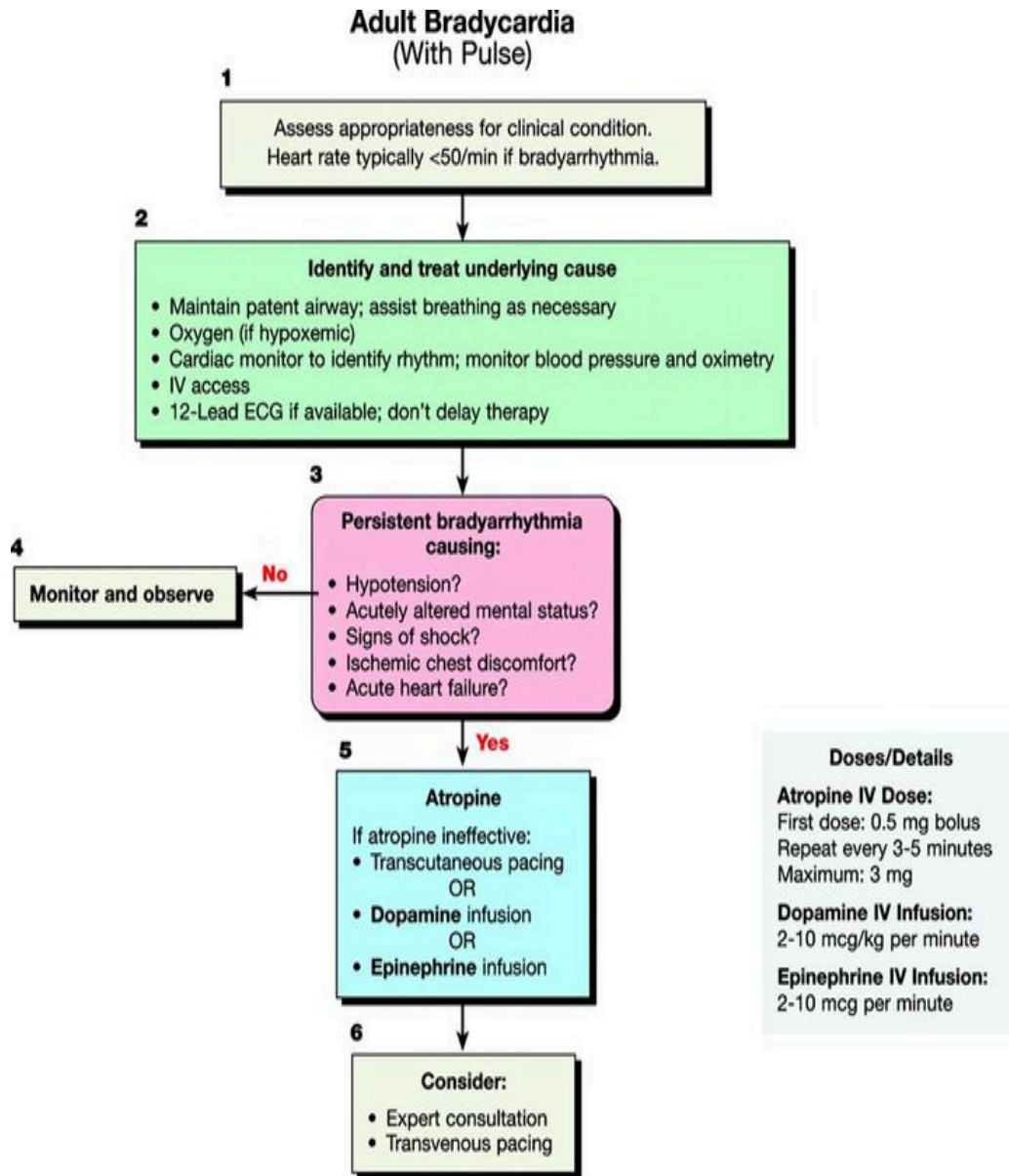
VT (Pulseless)



Cardiac Arrest Algorithm

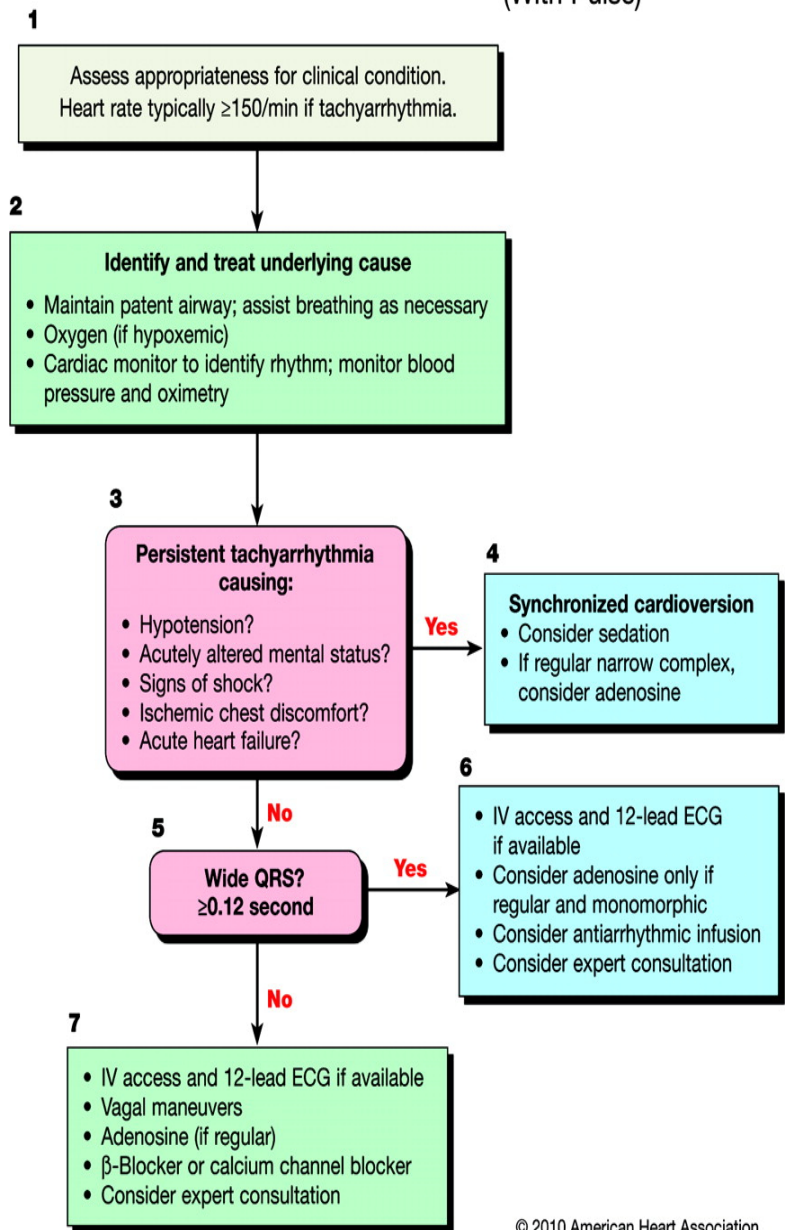


Bradycardia Algorithm



Tachycardia Algorithm

Adult Tachycardia (With Pulse)



Doses/Details

Synchronized Cardioversion
Initial recommended doses:

- Narrow regular: 50-100 J
- Narrow irregular: 120-200 J biphasic or 200 J monophasic
- Wide regular: 100 J
- Wide irregular: defibrillation dose (NOT synchronized)

Adenosine IV Dose:
First dose: 6 mg rapid IV push; follow with NS flush.
Second dose: 12 mg if required.

Antiarrhythmic Infusions for Stable Wide-QRS Tachycardia

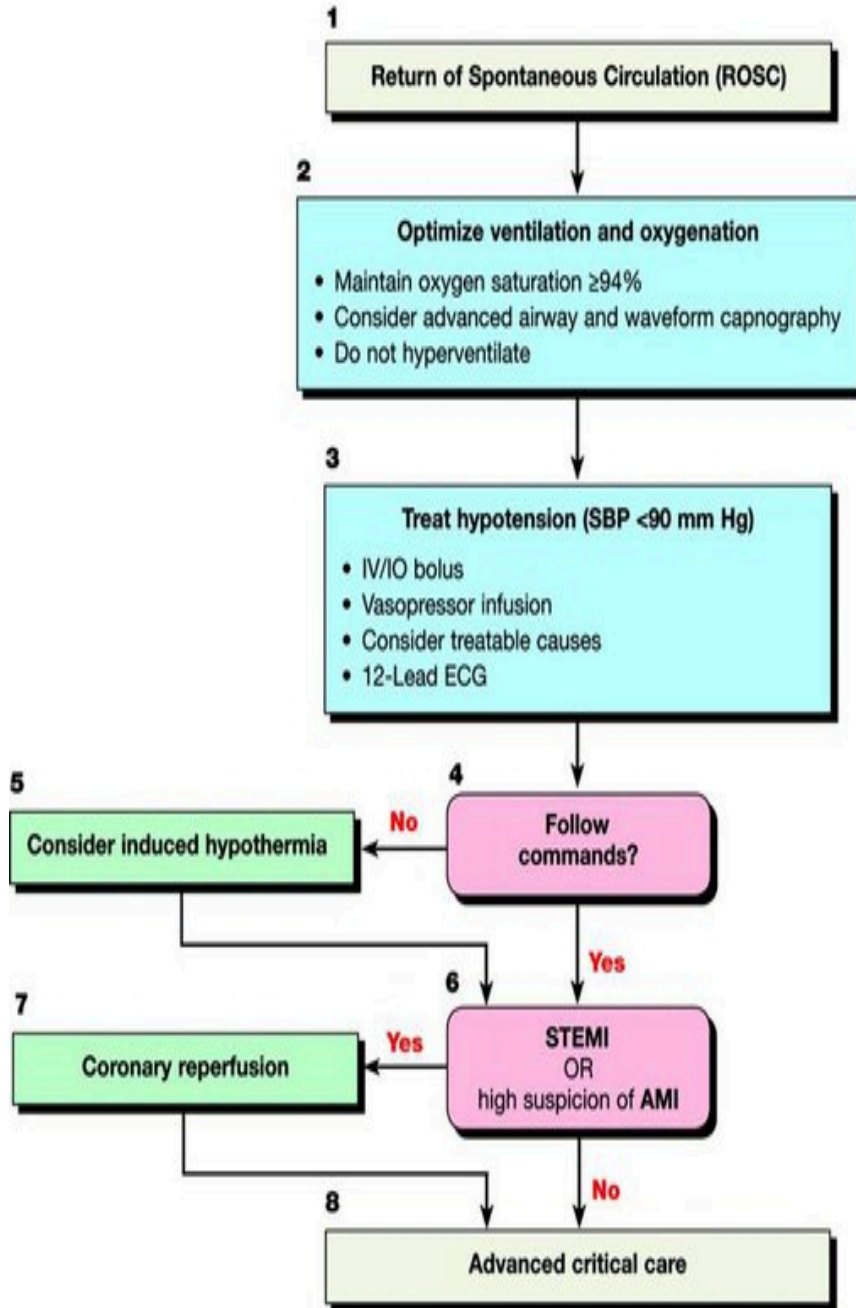
Procainamide IV Dose:
20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases >50%, or maximum dose 17 mg/kg given. Maintenance infusion: 1-4 mg/min. Avoid if prolonged QT or CHF.

Amiodarone IV Dose:
First dose: 150 mg over 10 minutes. Repeat as needed if VT recurs. Follow by maintenance infusion of 1 mg/min for first 6 hours.

Sotalol IV Dose:
100 mg (1.5 mg/kg) over 5 minutes. Avoid if prolonged QT.

Post Cardiac Arrest Algorithm

Adult Immediate Post-Cardiac Arrest Care



Doses/Details

Ventilation/Oxygenation

Avoid excessive ventilation. Start at 10-12 breaths/min and titrate to target PETCO₂ of 35-40 mm Hg. When feasible, titrate FIO₂ to minimum necessary to achieve Spo₂ ≥94%.

IV Bolus

1-2 L normal saline or lactated Ringer's. If inducing hypothermia, may use 4°C fluid.

Epinephrine IV Infusion:

0.1-0.5 mcg/kg per minute (in 70-kg adult: 7-35 mcg per minute)

Dopamine IV Infusion:

5-10 mcg/kg per minute

Norepinephrine

IV Infusion:

0.1-0.5 mcg/kg per minute (in 70-kg adult: 7-35 mcg per minute)

Reversible Causes

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

Heart Blocks



1st Degree Heart Block

Normal PR Interval .12-.20 seconds

The PR interval is delayed. Greater than .20 seconds.

The DELAY IS CONSTANT !

Treatment

Symptomatic ?

Atropine 0.5 mg every 3- 5 mins

If Atropine is ineffective , consider TCP

If TCP ineffective, consider Dopamine 2-10 mcg/kg/min

Heart Blocks



2nd Degree Type 1

The PR interval is progressively getting longer with an eventual drop of the QRS complex

Remember:

Going , going, GONE !!!

Treatment

Symptomatic ?

Atropine 0.5 mg every 3- 5 mins

If Atropine is ineffective , consider TCP

If TCP ineffective, consider Dopamine 2-10 mcg/kg/min

Heart Blocks



2nd Degree Type 2

The PR interval is constant however the QRS will drop

Remember:

More P waves than complexes

Treatment

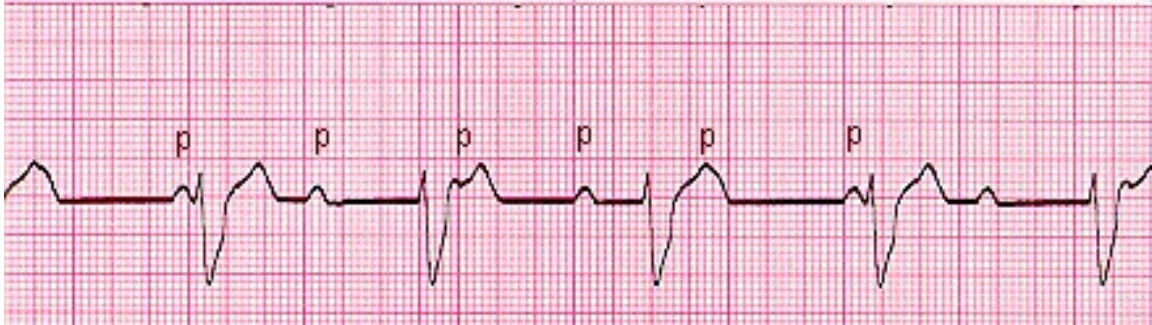
Symptomatic ?

Consider TCP

Increase milliamp until you gain full capture

If TCP ineffective, consider Dopamine 2-10 mcg/kg/min

Heart Blocks



3rd Degree (Complete AV Block)

There is total disassociation with the P wave and QRS complex

The QRS complex will contract on a regular interval

Treatment

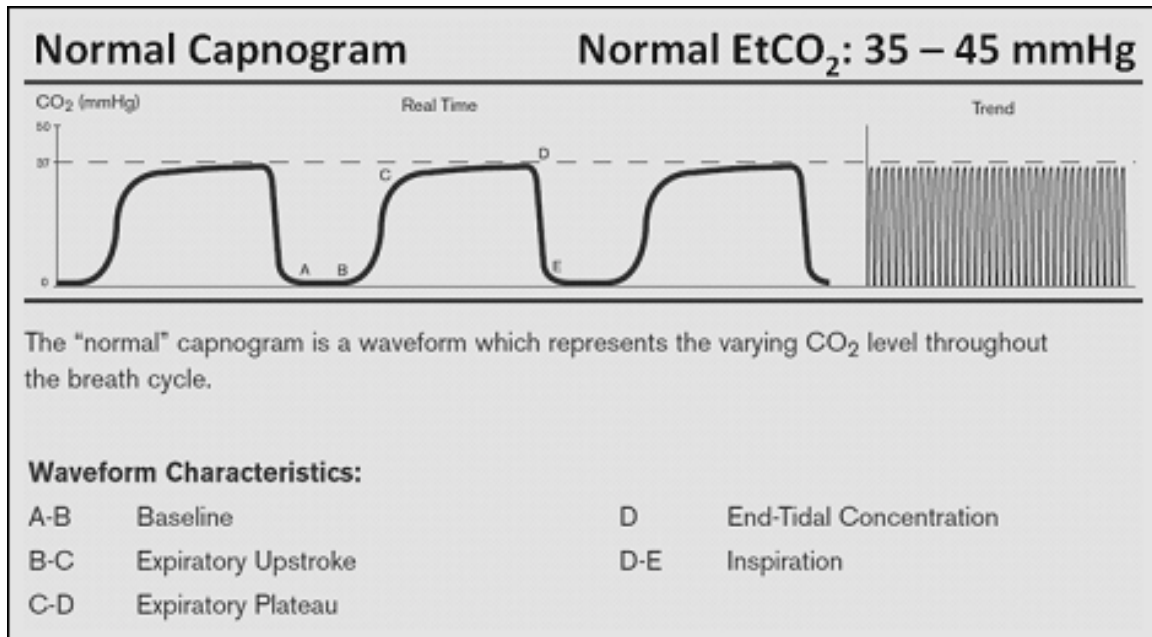
Symptomatic ?

Consider TCP

Increase milliamp until you gain full capture

If TCP ineffective, consider Dopamine 2-10 mcg/kg/min

Capnography



Applications on intubated patients:

Verification of ET tube placement
Monitoring and detection ET tube dislodgment
Loss of circulatory function
Determination of adequate CPR compressions
Confirmation of return of spontaneous circulation

American Heart Association recommends an ETCO₂ reading of:

35-40 mm hg

10-12 Breaths per min

SPo₂ > 94%

Capnography



Chest compression quality can be measured by the use of waveform capnography

< ETCo₂ 10 mm hg

CPR Quality is poor

Increase Depth and Increase Rate

ROSC

Return of Spontaneous Circulation

**Sustained increase in ETCo₂
>40 mm hg**

