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ADVANCED CARDIAC LIFE SUPPORT (ACLS)

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What is **A.C.L.S**?

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- **A**dvanced **C**ardiac **L**ife **S**upport (**ACLS**) refers to
  - **standardized, algorithmic** set of treatments used **to treat life-threatening cardiovascular conditions.**

What is **A.C.L.S**? (2)

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- **A**dvanced **C**ardiac **L**ife **S**upport (**ACLS**) refers to:

1. a set of **clinical guidelines** for
2. the **urgent and emergent** treatment of
3. **life-threatening cardiovascular conditions** that
4. will cause or have caused **cardiac arrest**, using
5. advanced medical **procedures, medications,** and **techniques**.

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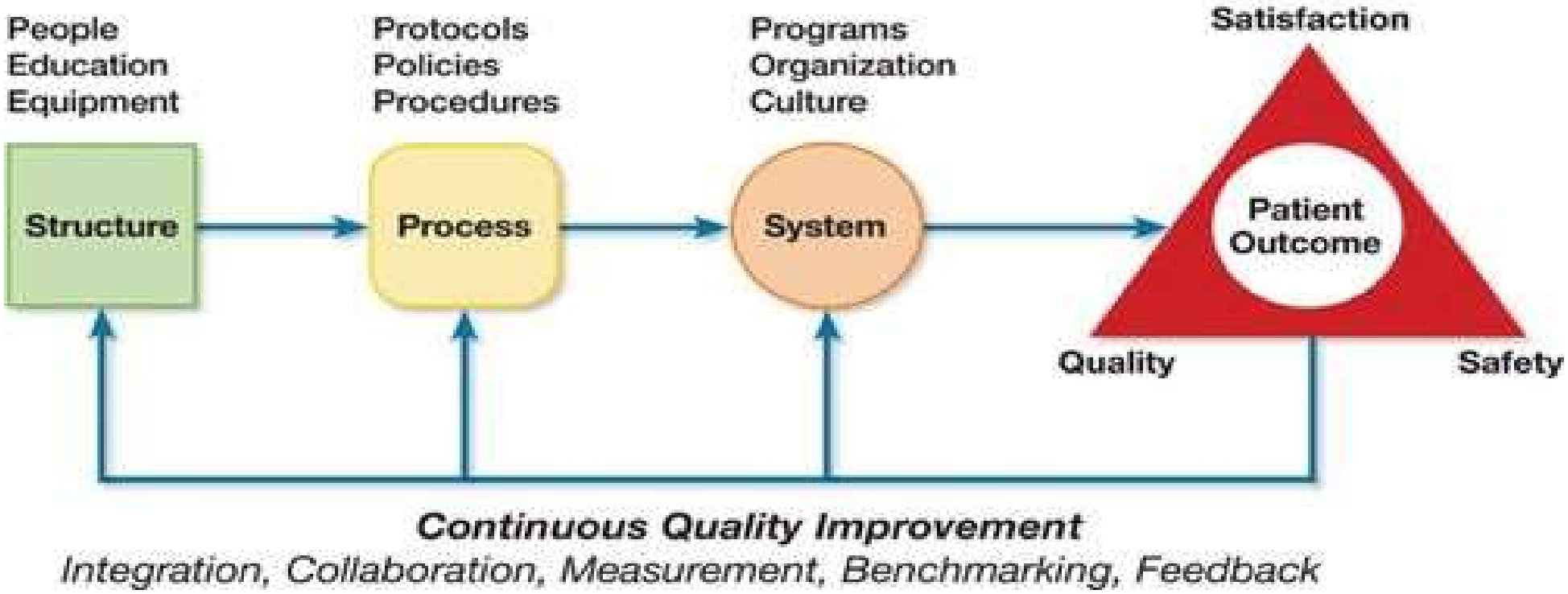
Taxonomy of Systems of Care: SPSO

Structure Process System Outcome



A.C.L.S STEPS

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Assessment- Primary and Secondary

1. **Basic Life Support/CPR**
2. **Crisis Resource Management**
3. **Rhythm Identification & Treatment**
   a. Electrotherapy: Cardioversion, Defibrillation, Pacing
   b. Medications
4. **Advanced Airway Management**
5. **Specialized Life Support***

ACLS

ASSESS & RE-ASSESS ALL OF THE FOLLOWING

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AIRWAY	BREATHING	CIRCULATION	DISABILITY	EXPOSURE

• Advanced Airway present?
• Advanced Airway needed?
• Proper placement of airway device?
• Tube Secured?
• Reconfirm placement frequently and with every transition
	• Adequate Ventilation?
	• Adequate Oxygenation?
	• Monitoring of the following?
	  • Quantitative Waveform Capnography
	  • Oxyhemoglobin Saturation
		• Effective Chest Compressions?
		• Cardiac Rhythm?
		• Need for Defibrillation or Cardioversion?
		• IV/IO access established?
		• ROSC?
		• Medications for BP or Rhythm needed?
		• Fluid resuscitation needed?
			• Neurologic Function
			• Responsiveness
			• Level of Consciousness
			• Pupil dilatation
			• AVPU: Alert, Voice, Painful, unresponsive
				• Expose to perform physical Examination
				• Look for signs of:
				  • Trauma
				  • Bleeding
				  • Burns
				  • Unusual markings
				  • Medical Alert bracelets

Secondary assessment

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- Secondary assessment involves differential diagnosis.
  - (SAMPLE, H's and T's)
- This focus on medical history and search for underlying causes
  - (H'S and T's)

H's	T's
Hypervolemia	**Tension pneumothorax**
Hypoxia	**Tamponade (cardiac)**
Hydrogen ion(acidosis)	**Toxins**
Hypokalemia/hyperkalemia	**Thrombosis(pulmonary)**
Hypothermia	**Thrombosis(coronary)**

1. BLS RECAP

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Confirm Situation	Call for Help	Compressions	Airway & Ventilation	Defibrillation- AED ASAP!
Check Responsiveness	Extra hands	Firm Surface	30:2	Don't touch
			Chin Lift	
Check Pulse	Defibrillator	100-120c per min	Firm mask + Ambu Bag	Put off open oxygen
Check Breathing	Crash Cart	5cm depth	Avoid Hyperventilation	No wet chest surface
Check Safety	ACLS Team	Minimize Interruptions	Oxygen therapy	Follow Prompts
		Locked Palms + Straight Elbows		

7th Abuja Car

A.C.L.S STEPS

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5. **Specialized Life Support**

ACLS

2. Crisis Resource Management

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- There are **three (3) Key Principles** of ACLS Crisis Resource Management:
  a. **Leadership**
  b. **Communication**
  c. **Preparation**

2. Crisis Resource Management -a. Leadership

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- **One Person** assumes role of Team Leader

- <u>Global Management of resuscitation</u>
  i. Ensure that **all tasks are carried out competently**
  ii. Coordinate Communication among team members
  iii. Develop & Implement **management strategies**
  iv. Reassessing Performance throughout resuscitation
  v. Collates the experience and wisdom of the entire team

2. Crisis Resource Management -b. Communication

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- All pertinent information goes **through the team leader**
- Tasks are assigned by the team leader **to team member**
- Team member **repeat back** the instruction (**CLOSED LOOP COMMUNICATION)**
- **Extraneous personnel** not involved are asked to leave to reduce noise and increase focus
- **Debrief the team for learning points** after resuscitation

2. Crisis Resource Management -c. Preparation

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- Vascular Access
- Oxygen Administration
- Cardiac Monitor- Oxygen Saturation, ETC02
- Obtain ECG
- Crash Cart
- Advanced Airway

2. Crisis Resource Management
ACLS Team Dynamics

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- **Common team roles include:**
  a. Leader,
  b. 2-3 CPR performers,
  c. An airway/respiratory specialist,
  d. An IV access and medication administration person,
  e. A monitor/ defibrillator attendant,
  f. A recorder to document the treatment

A.C.L.S STEPS

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1. Basic Life Support/CPR

2. Crisis Resource Management
3. **Rhythm Identification & Treatment**
   a. **Electrotherapy: Cardioversion, Defibrillation, Pacing**
   b. **Medications**
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ACLS

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3. Rhythm Identification & Treatment

Successful ACLS treatment starts with **the correct diagnosis of the ECG rhythm** causing the situation.

ACLS ECG Rhythms

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Cardiac Arrest *(no-pulse)* Rhythms	**1. Ventricular fibrillation/Pulseless Ventricular Tachycardia,**
	2. Pulseless Electrical Activity/Asystole
Non-Arrest *(pulse)* Rhythms	**1. Narrow- complex tachycardia**
	2. Wide-complex tachycardia,
	3. Bradycardia

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Cardiac Arrest (NO PULSE) ACLS

3. Rhythm Identification & Treatment

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a. Cardiac Arrest + No pulse - 1

What ECG Pattern is this in the Cardiac Arrest?

a. **Ventricular Fibrillation**

b. **Pulseless Ventricular Tachycardia**

c. **Pulseless Electrical Activity**

d. **Asystole**

3. Rhythm Identification & Treatment

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a. Cardiac Arrest + No pulse - 2

Asystole:agonal complexes too slow to make this rhythm "PEA"

What ECG Pattern is this in the Cardiac Arrest?

a. **Ventricular Fibrillation**

b. **Pulseless Ventricular Tachycardia**

c. **Pulseless Electrical Activity**

d. **Asystole**

3. Rhythm Identification & Treatment

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Non-Shockable Rhythms- PEA/Asystole

- Exclude Causes
- 5Hs and 5Ts

1. Adrenaline 1mg
2. Repeat Adrenaline every 3-5 mins after rechecking rhythm
3. Continue CPR
4. Recheck Rhythm every 2-3 mins

3. Rhythm Identification & Treatment

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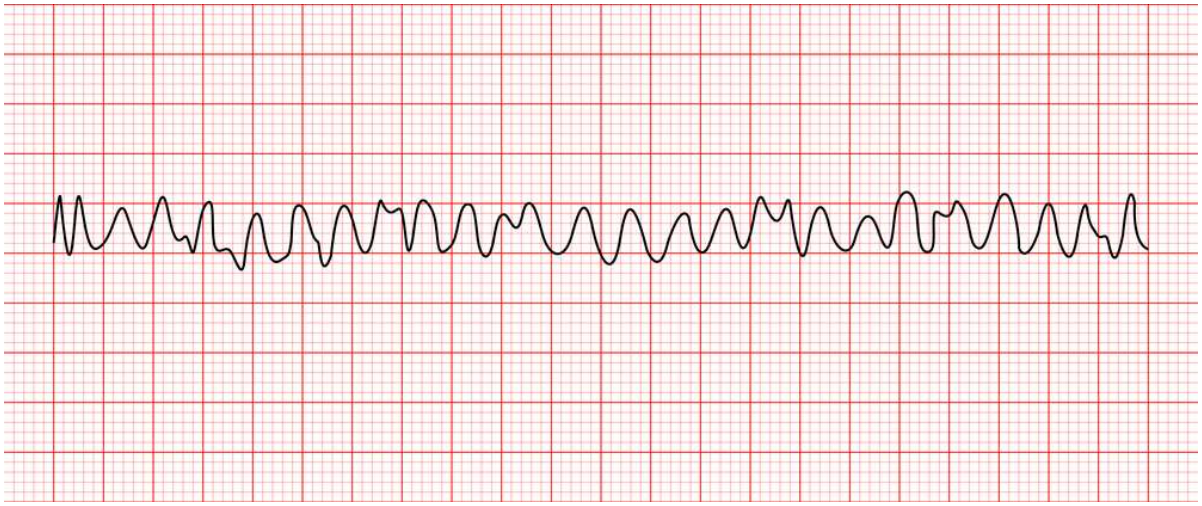
a. Cardiac Arrest- No pulse - 3



What ECG Pattern is this in the Cardiac Arrest?

a. **Ventricular Fibrillation**

b. **Pulseless Ventricular Tachycardia**

c. **Pulseless Electrical Activity**

d. **Asystole**

No recognizable complexes

Check that ECG cable is fixed well

Ventricular Fibrillation

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3. Rhythm Identification & Treatment

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a. Cardiac Arrest- No pulse - 4

Wide QRS Complex- Regular or Irregular, No P Waves

What ECG Pattern is this in the Cardiac Arrest?

a. **Ventricular Fibrillation**

b. **Pulseless Ventricular Tachycardia**

c. **Pulseless Electrical Activity**

d. **Asystole**

3. Rhythm Identification & Treatment

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Shockable Rhythms- pVT/VF

- Exclude Causes
- 5Hs and 5Ts

1. Adrenaline 1mg
2. Repeat Adrenaline every 3-5 mins after rechecking rhythm
3. Continue CPR
4. Recheck Rhythm every 2-3 mins
5. **Give IV Amiodarone after 2nd or 3rd Shock**

Reversible Causes

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5Hs

1. Hypoxia
2. Hypovolemia
3. Hypo/Hyperkalemia
4. Hypothermia
5. Hydrogen Excess (Acidosis)

5Ts

1. Thrombus (cardiac or pulmonary)
2. Tension Pneumothorax
3. Tamponade
4. Toxin
5. Trauma

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Examples of one of the Ts (Thrombus- Stroke, STEMI)

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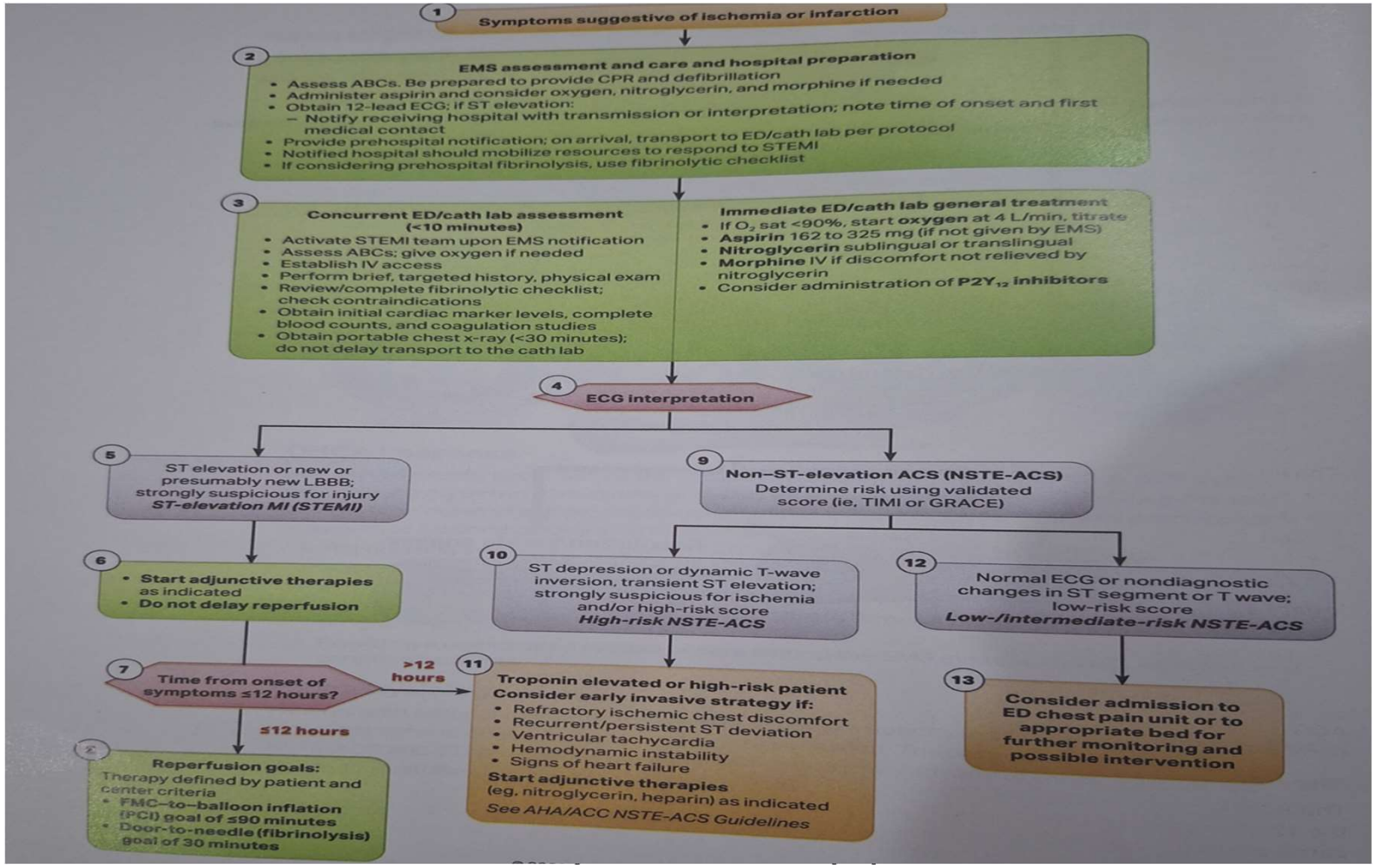
ACS



ECG

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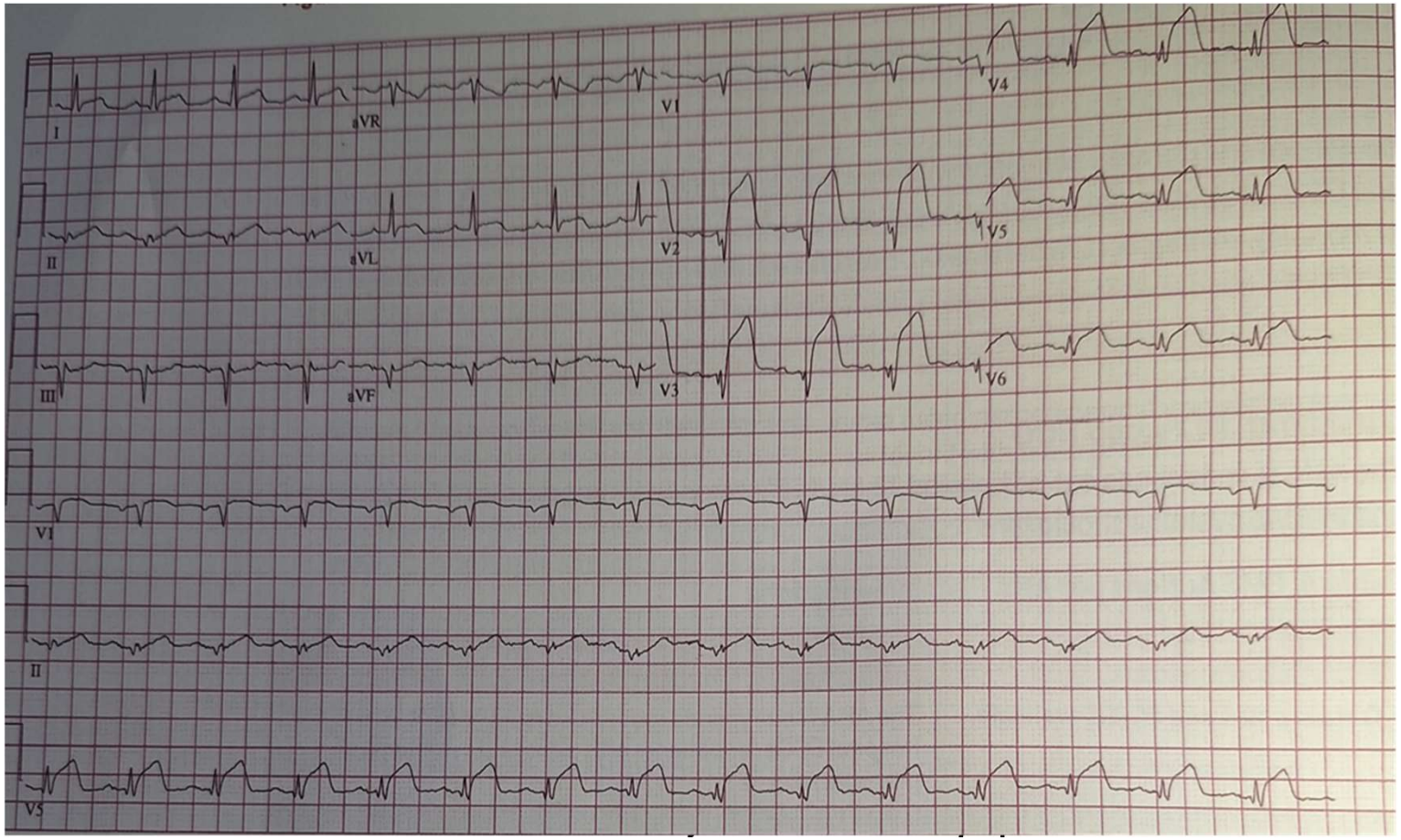

ACUTE STROKE MGT

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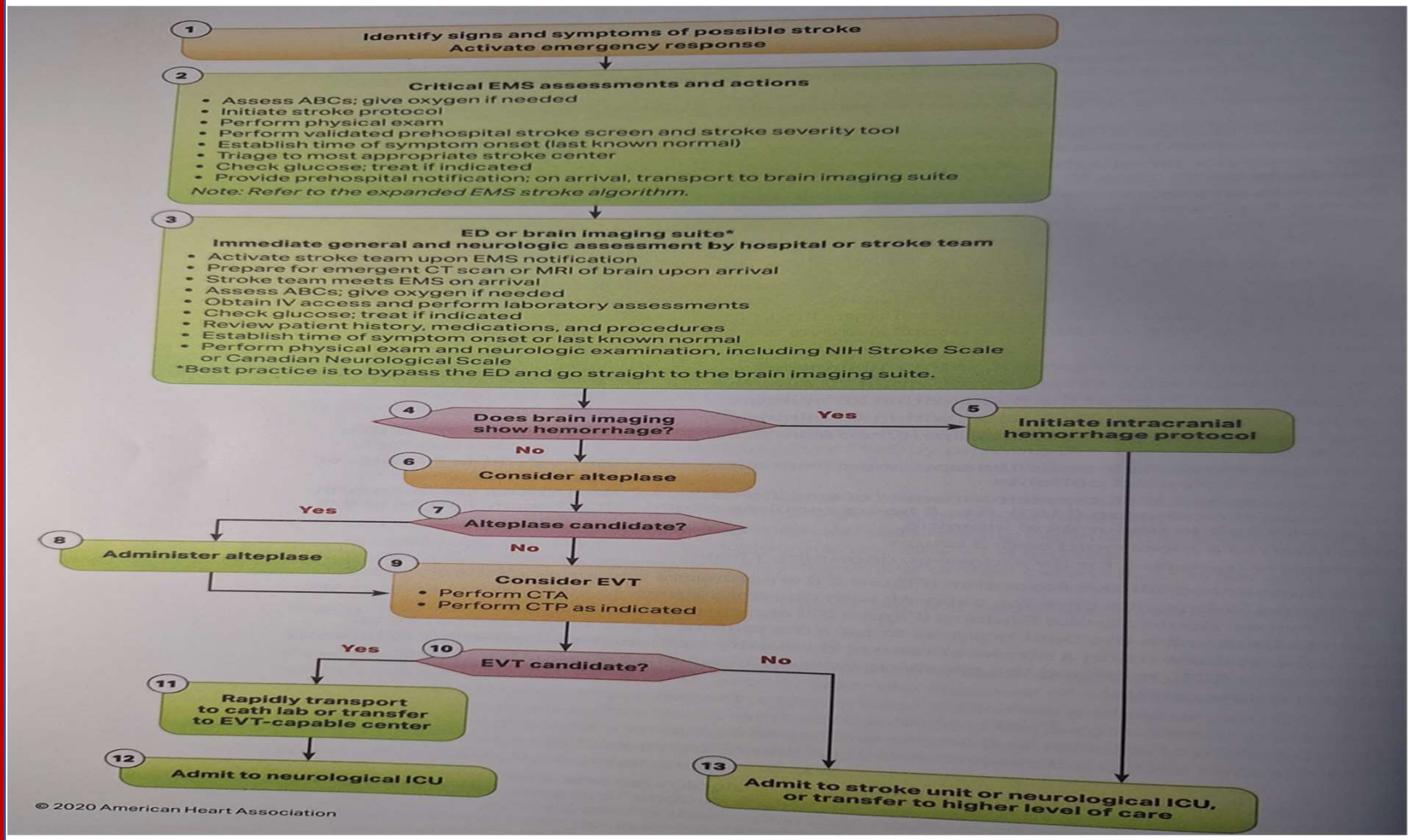

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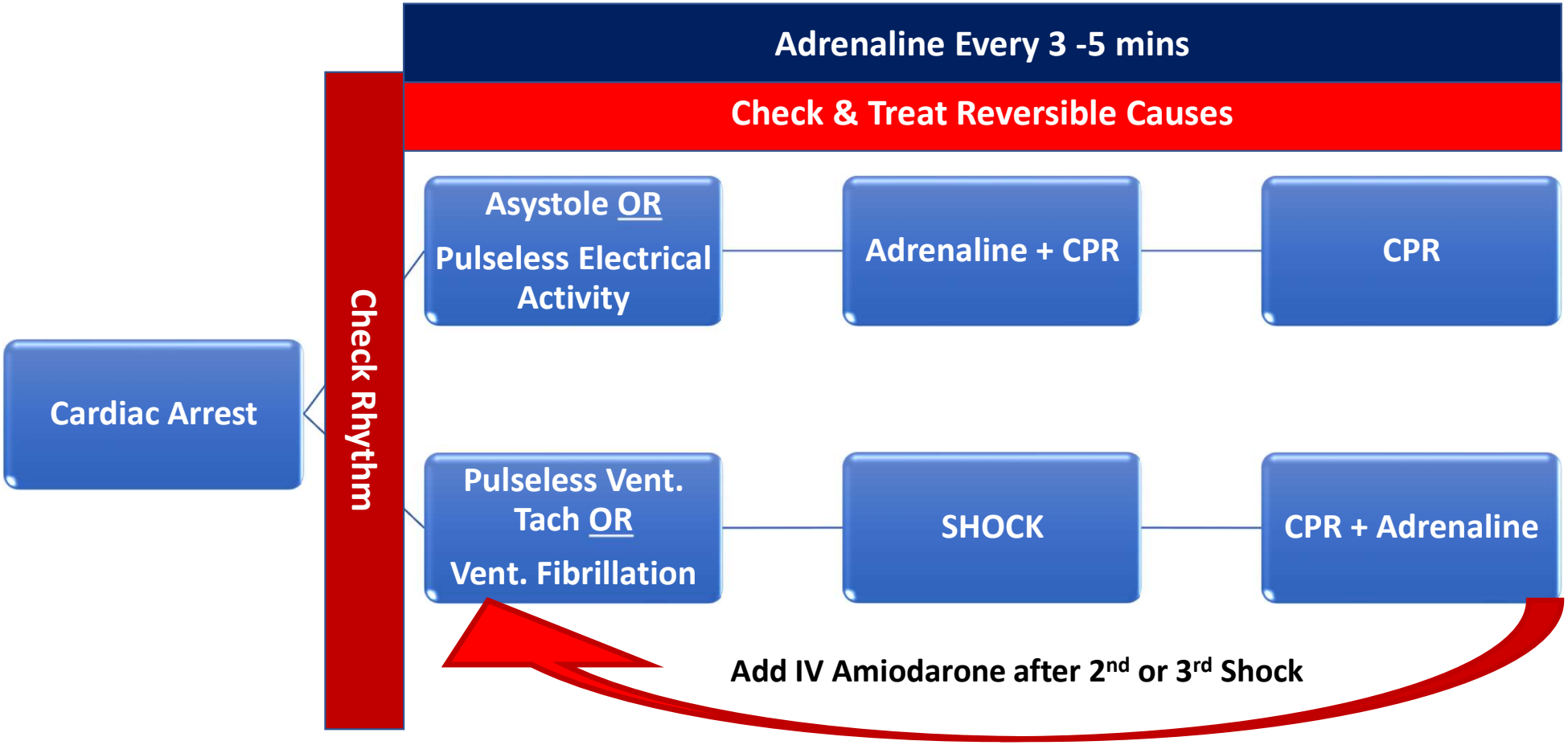

Pulseless VT in Cardiocare!

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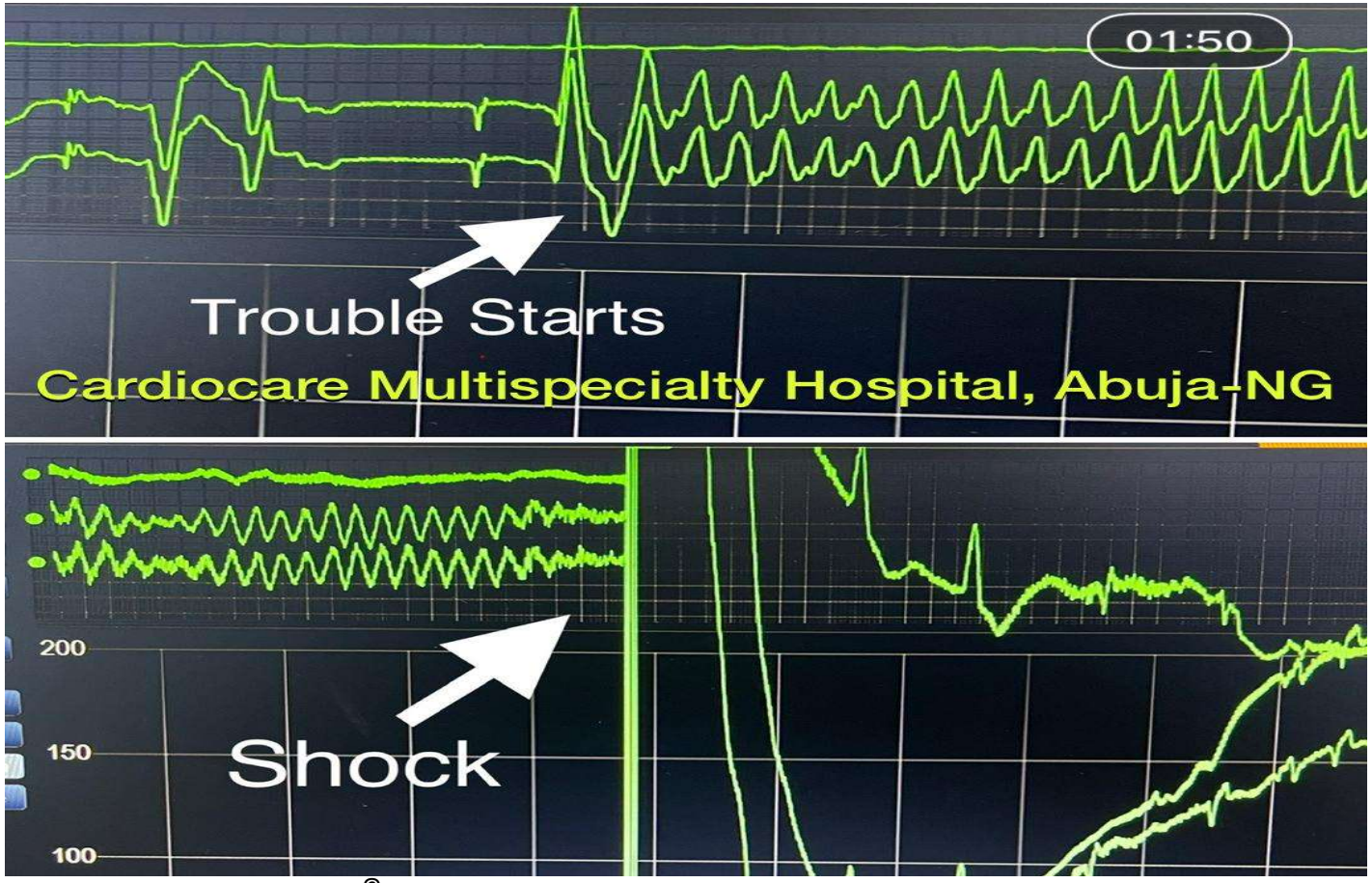

ACLS ECG Rhythm Summary

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Cardiac Arrest Rhythms	1. Pulseless Ventricular Tachycardia	Shockable	1. Shock	3. Amiodarone or Lidocaine	CHECK AND TREAT ANY OF THE 5Hs AND Ts
	2. Ventricular Fibrillation		2. CPR	4. Adrenaline	
	3. Pulseless Electrical Activity	Non-Shockable	1. CPR		
	4. Asystole		2. Adrenaline		
Non-Arrest Rhythms	1. Wide Complex Tachy	Stable	Medications		
		Unstable	Cardiovert	Medications	
	2. Narrow Complex Tachy	Unstable			
		Stable	Vagal Maneuvers	Medications	
	3. Bradycardia	Stable	Monitor, Check reversible causes	Prepare for permanent pacing	
		Unstable	Meds(Atropine, Adrenaline, Dopamine)	Transcutaneous or Temporary Pacing	

UNSTABLE = Hypotension, Shock, Chest Pain, HF, Altered Sensorium

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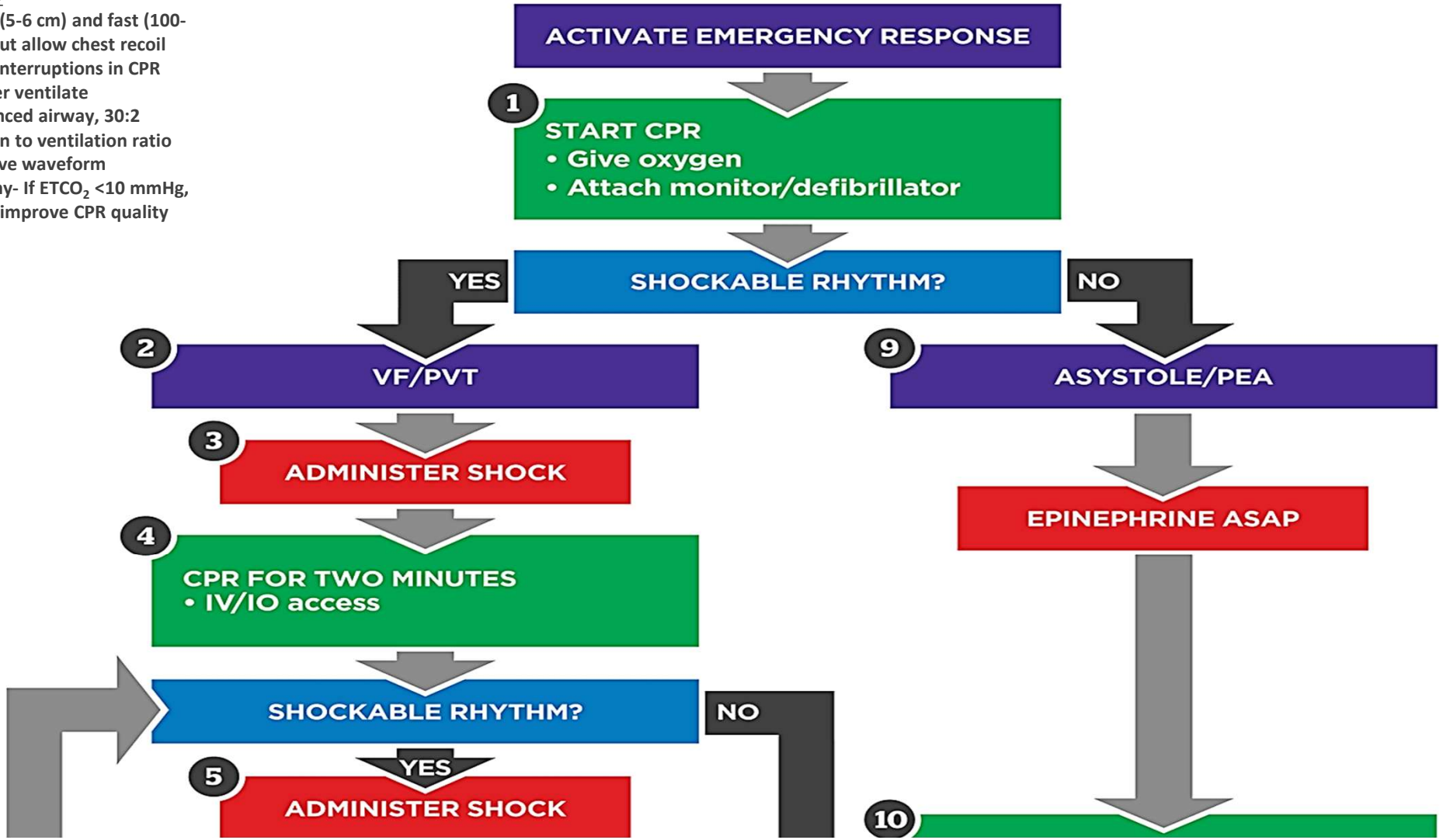
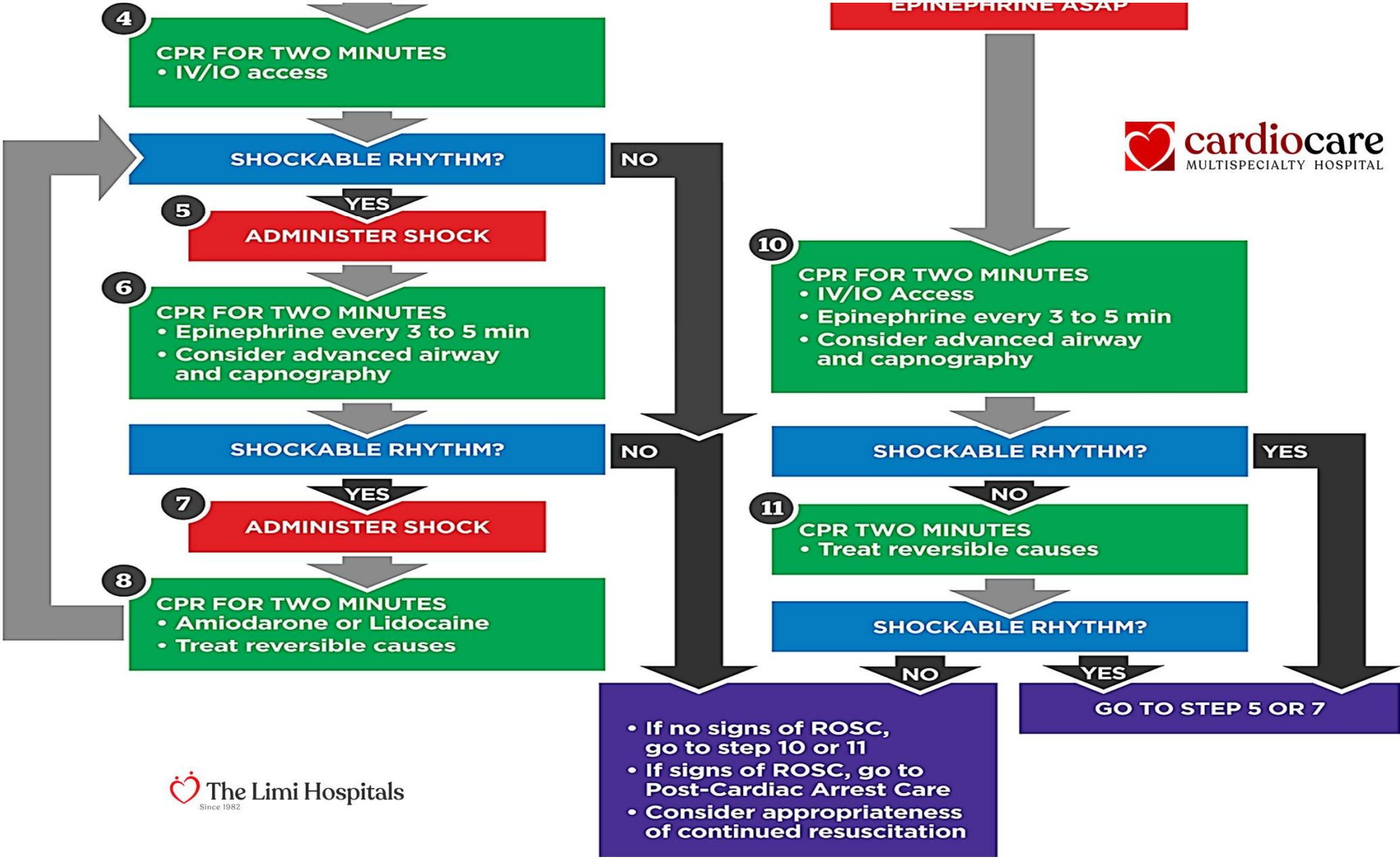
CPR Quality

- Push hard (5-6 cm) and fast (100-120 bpm) but allow chest recoil
- Minimize interruptions in CPR
- Do not over ventilate
- If no advanced airway, 30:2 compression to ventilation ratio
- Quantitative waveform capnography- If $ETCO_2$ <10 mmHg, attempt to improve CPR quality





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NON-ARREST (PULSE) RHYTHMS

Adult Tachycardia + Pulse

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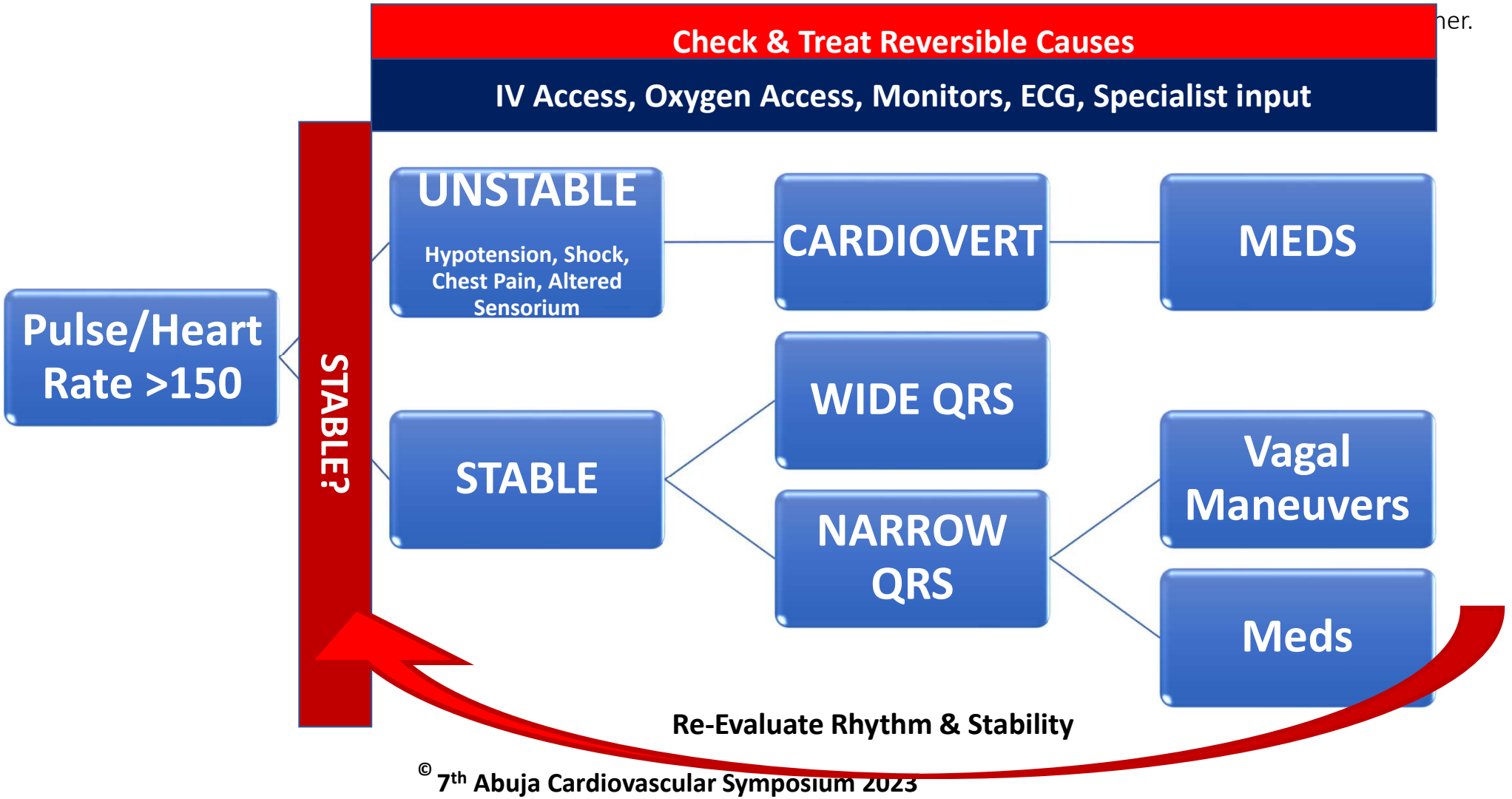

UNSTABLE ADULT TACHYCARDIA WITH PULSE

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- **Synchronised Cardioversion** - shock delivery that is timed (synchronized) with the QRS complex
  - Narrow regular: 50 – 100 J
  - Narrow irregular: Biphasic – 120 – 200 J and Monophasic – 200 J
  - Wide regular – 100 J

- Wide Irregular – defibrillation dose (pulse is unlikely- cardiac arrest)

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Stable, Adult Tachycardia with Pulse

Wide Complex Regular

1. Anti-arrhythmic infusion
   - Amiodarone Infusion
   - Procainamide
2. Consider Adenosine if regular and monomorphic

Narrow Complex

1. Vagal Maneuvers
2. IV Adenosine (if regular)
   - 6mg fast + flush
   - Repeat 12mg + flush if needed
3. Beta Blocker
4. Calcium Channel Blocker

Adult Bradycardia With Pulse

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UNSTABLE?

Hypotension, Shock, Chest Pain, HF, Altered Sensorium

- Atropine

Or

- Dopamine

OR

- Epinephrine infusion

OR

- Transcutaneous Pacing

STABLE?

- Monitor and Observe
- Treat reversible causes
- Prepare for permanent pacing if irreversible causes

Adult Bradycardia With Pulse

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UNSTABLE?

Hypotension, Shock, Chest Pain, HF, Altered Sensorium

- **Atropine (0.5-1mg) bolus**
  - Repeat 1mg every 3-5mins
  - Total dose of 3mg
  - Further interventions should not be delayed for the administration of Atropine

THEN

- **Transcutaneous Pacing**

OR

- **Epinephrine infusion (2-10mcg/min)**
- AND/OR **Dopamine Infusion (2-10mcg/min)** either added to epinephrine or given alone

- *Atropine is a good initial treatment for symptomatic bradycardia, as long as there is no evidence for 2nd degree Mobitz type II or 3rd degree heart block.*
- *Atropine works at the AV node, and is unlikely to be effective if blockages in conduction are at or below the Bundle of His.*
- *It will also be ineffective in transplanted hearts, due to a lack of vagal innervation.*

ACLS ECG Rhythm Summary

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Cardiac Arrest Rhythms	1. Pulseless Ventricular Tachycardia	Shockable	1. Shock	3. Amiodarone or Lidocaine	CHECK AND TREAT ANY OF THE 5Hs AND Ts
	2. Ventricular Fibrillation		2. CPR	4. Adrenaline	
	3. Pulseless Electrical Activity	Non-Shockable	1. CPR		
	4. Asystole		2. Adrenaline	3. Atropine	
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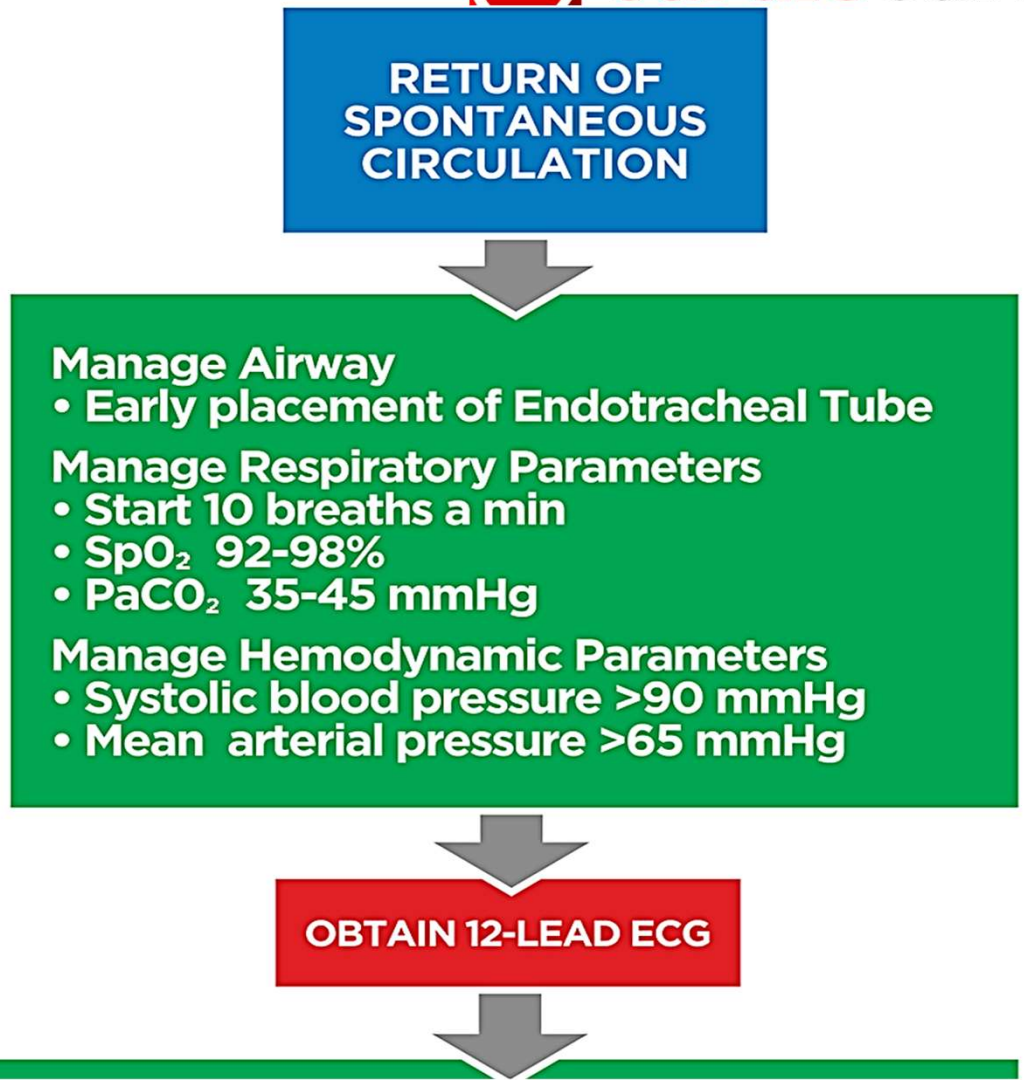
POST CARDIAC ARREST CARE

ADULT IMMEDIATE POST CARDIAC ARREST ALGORITHM



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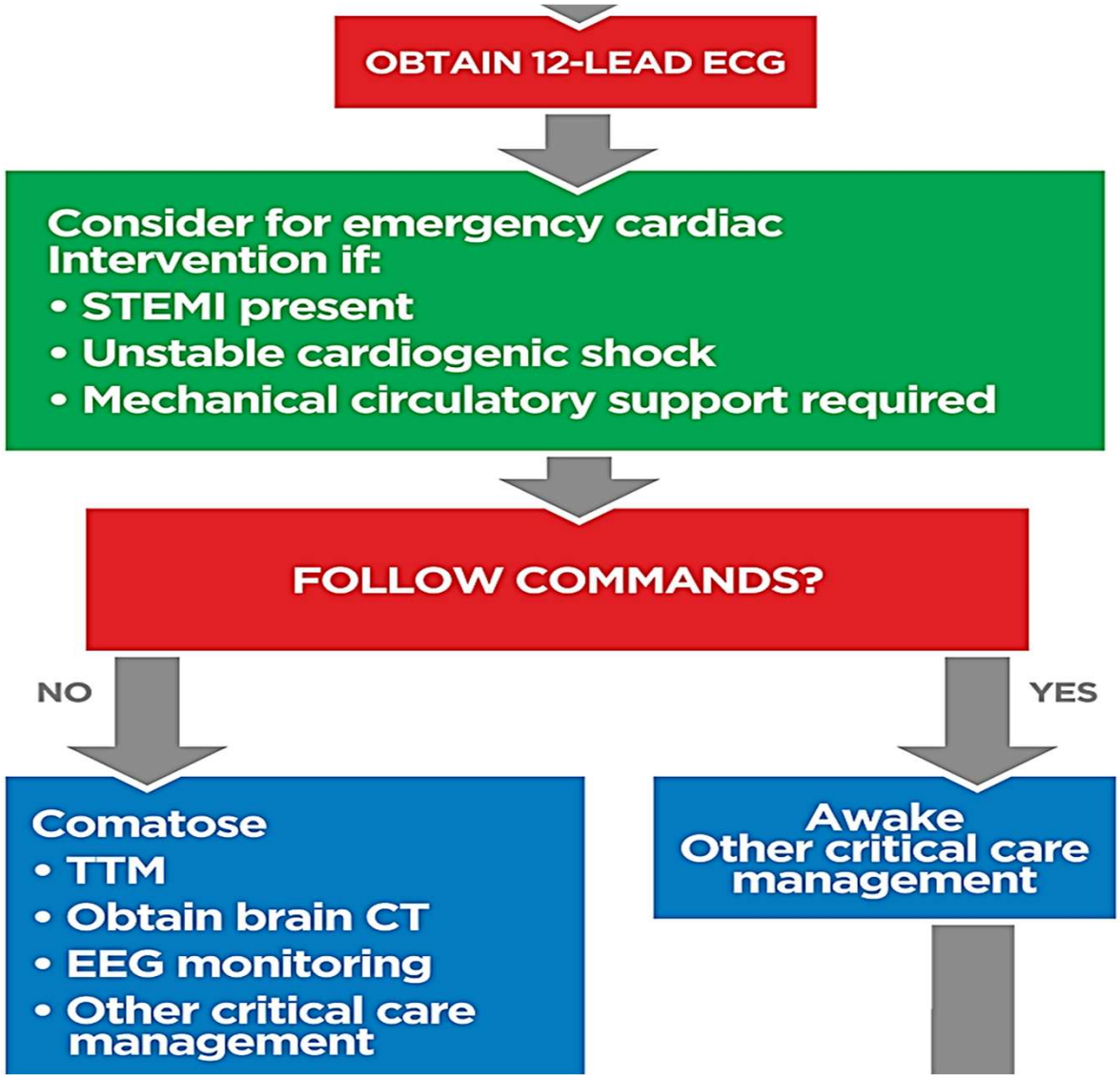
ADULT IMMEDIATE POST CARDIAC ARREST ALGORITHM (2)



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ADULT IMMEDIATE POST CARDIAC ARREST ALGORITHM

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- **Ventilation**
  - 10-12 per minute to target PACO2 (35-45mmhg)
- **Treat Reversible Causes**
- **Maintain Hemodynamics >90/60**
  - Saline Bolus (1-2L)
  - Epinephrine Infusion (0.1-0.5mcg/kg/min)
  - Dopamine Infusion (5-10 mcg/kg/min)
  - Norepinephrine Infusion (0.1-0.5mcg/kg/min)
- **Specialist Consultation**

A.C.L.S STEPS

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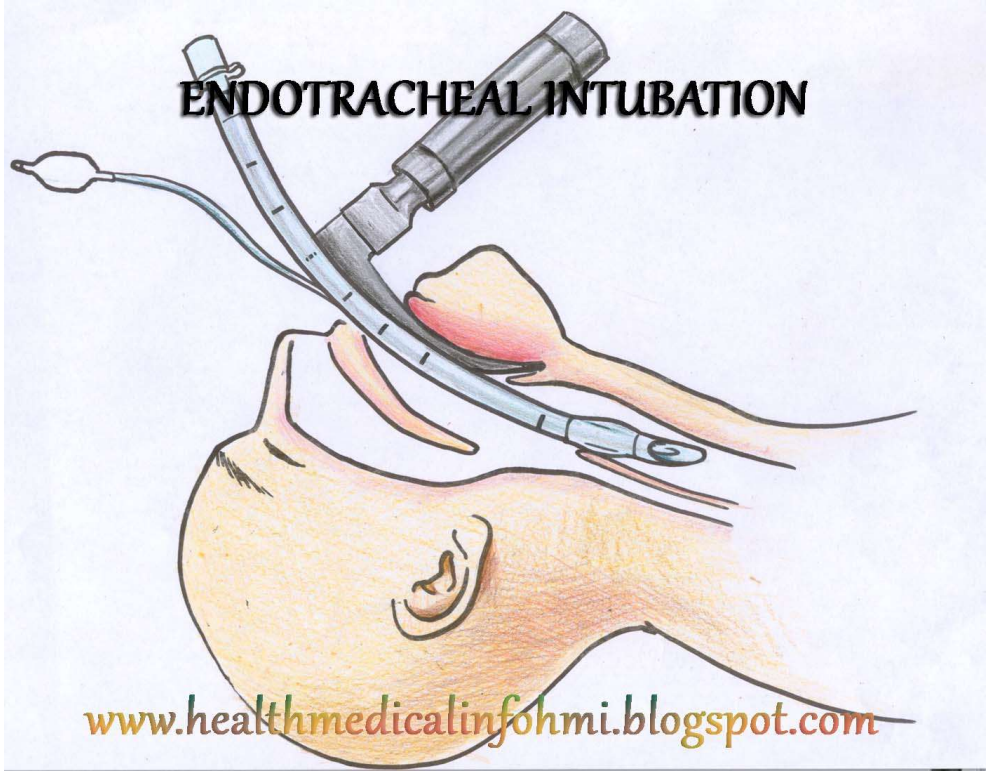
4. Advanced Airway Management

- **BASIC AIRWAYS**
  - Oropharyngeal airway
  - Nasopharyngeal airway
- **ADVANCED**
  - Endotracheal tube
  - Laryngeal mask airway
  - Laryngeal tube
  - Esophageal tracheal tube



A.C.L.S STEPS

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5. Specialized Interventions

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- **PCI-** Percutaneous intervention (coronary artery stents in cathlab)
- **IABP-** Intra-aortic Balloon Pump
- **Pacing-** Temporary/Permanent
- **ECMO** – Extracorporeal Membrane Oxygenation

Crash Cart

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- Amiodarone
- Adenosine*
- Adrenaline
- Atropine
- Bicarbonate
- Calcium Gluconate
- Dopamine
- Dobutamine
- Diazepam
- Glucose-50%
- Labetalol
- Lignocaine
- Phenytoin
- Normal Saline
- Endotracheal Tube
- Laryngoscope + batteries
- Laryngeal Mask
- Oropharyngeal Airway
- Ambu Bag
- Oxygen Tubings
- Sunction Tube
- IV Cannulae and Lines
- Central Line Cannulation set
- Cut Down set

Few Learning Points

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- Assess and manage at every step before moving on to the next step
- Rapid defibrillation is the ONLY effective treatment for VF/VT
- Search for and treat the cause
- Treat the patient not the monitor
- Reassess frequently
- Minimize interruptions to chest compressions

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ACLS MEGACODE

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Case 1

52 yr old collapsed at a rally

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- Bystanders performed CPR at the scene
- He arrives at your hospital with thready Pulse, BP- 60/30mmhg, SpO2-95%

52yr old collapsed at a rally

Thready Pulse, BP- 60/30mmhg, SpO2-95%

- What are the Initial Steps in management?

1. Cardiovert
2. Adenosine
3. ABCs
4. Consult Cardiology

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52yr old collapsed at a rally

Thready Pulse, BP- 60/30mmhg, SpO2-95%

- What are the Initial Steps in management?

1. Cardiovert
2. Adenosine
3. **ABCs**
4. Consult Cardiology

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ECG for patient

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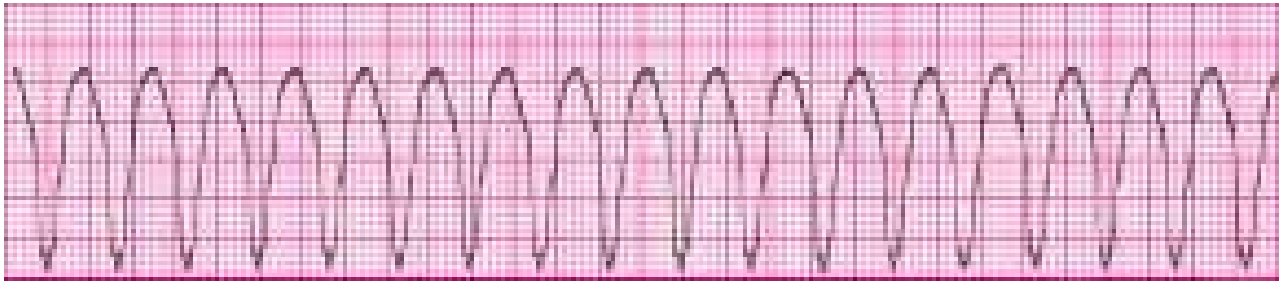

52yr old collapsed at a rally

Thready Pulse, BP- 60/30mmhg, SpO2-95%

- What is the Initial management?

1. Amiodarone
2. Defibrillation
3. Cardioversion
4. All of the Above

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52yr old collapsed at a rally

Thready Pulse, BP- 60/30mmhg, SpO2-95%

- What is the Initial management?

1. Amiodarone
2. Defibrillation
3. **Cardioversion**
4. All of the Above

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52yr old collapsed at a rally

Thready Pulse, BP- 60/30mmhg, SpO2-95%

- What is the Dose of Cardioversion?

1. 50-100j
2. 200j
3. 360j

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52yr old collapsed at a rally

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- What is the Dose of Cardioversion?

1. **50-100j**
2. 200j
3. 360j

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- **YOU ATTEMPTED CARDIOVERSION BUT, UNFORTUNATELY, THE PATIENT HAS NOW LOST A PULSE!!!**

YOU ATTEMPTED CARDIOVERSION BUT, UNFORTUNATELY, THE PATIENT HAS NOW LOST A PULSE!!!

- **What is your Next Step?**
    1. Amiodarone
    2. Adrenaline
    3. Defibrillation
    4. Cardioversion

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YOU ATTEMPTED CARDIOVERSION BUT, UNFORTUNATELY, THE PATIENT HAS NOW LOST A PULSE!!!

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- **What is your Next Step?**
  1. Amiodarone
  2. Adrenaline
  3. **Defibrillation**
  4. Cardioversion

> The patient is in pulseless ventricular tachycardia and like ventricular fibrillation, deliverance of rapid defibrillation can be life-saving. Initiate CPR until the machine is ready to defibrillate. Make sure everyone is "clear" prior to delivering shock.

AFTER A WHILE, 52yr old collapsed at a rally

No Pulse, BP- 40/20mmhg, SpO2-??%

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- Which of the following medications should be used for Pulseless VT?

1. 1mg Adrenaline, 150mg Amiodarone, subsequent CPR
2. 6mg Adenosine, 150mg Amiodarone, subsequent CPR
3. 1mg Adrenaline, 300mg Amiodarone, subsequent CPR
4. 1mg Atropine, Consider Adrenaline, subsequent CPR

AFTER A WHILE, 52yr old collapsed at a rally

No Pulse, BP- 40/20mmhg, SpO2-??%

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2. 6mg Adenosine, 150mg Amiodarone, subsequent CPR
3. **1mg Adrenaline, 300mg Amiodarone, subsequent CPR**
4. 1mg Atropine, Consider Adrenaline, subsequent CPR

For ventricular fibrillation or pulseless ventricular tachycardia, the mainstay of treatment is rapid defibrillation with administration of effective CPR. During this time, you can administer epinephrine, 1mg, and consider giving Amiodarone 300mg. The initial dose of amiodarone in a pulseless/coding patient is 300mg, followed by 150mg if additional doses are required. For a patient that is stable ventricular tachycardia (has a pulse, is not hypo perfused), the initial dose of amiodarone is 150mg bolus over 10 minutes.

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Case 2

63 yo man with a witnessed collapse while mowing the lawn

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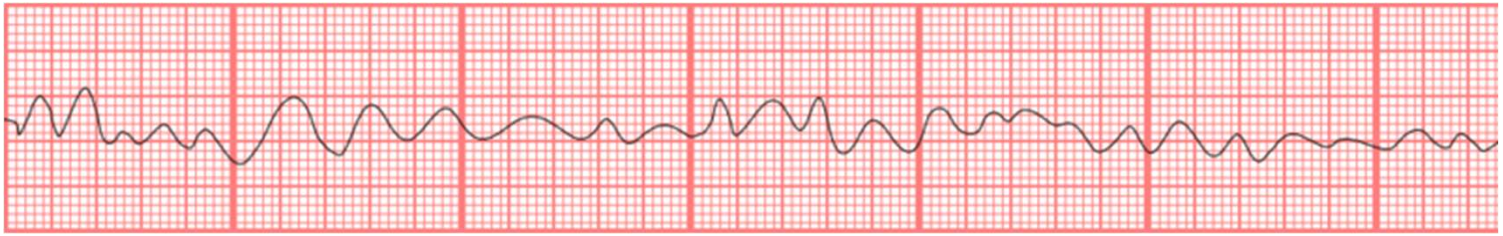

What is the rhythm?

What is the management?

Chikumaya, Wikimedia Commons

PD-SELF

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Ventricular Fibrillation

- Rapid and irregular
- No normal P waves or QRS complexes

VF / Pulseless VT

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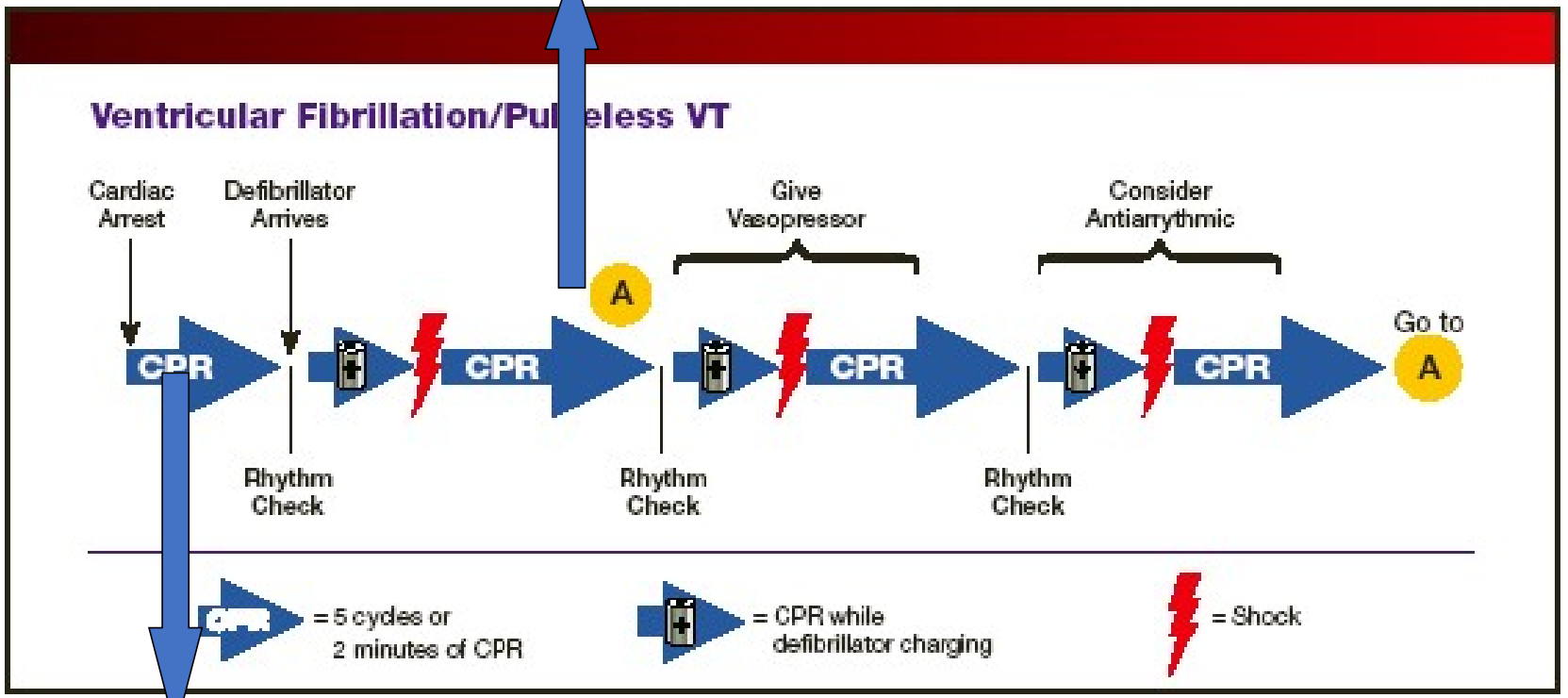
Secondary Survey - ABC



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Primary Survey - ABC

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Case 3

79yo man s/p NSTEMI

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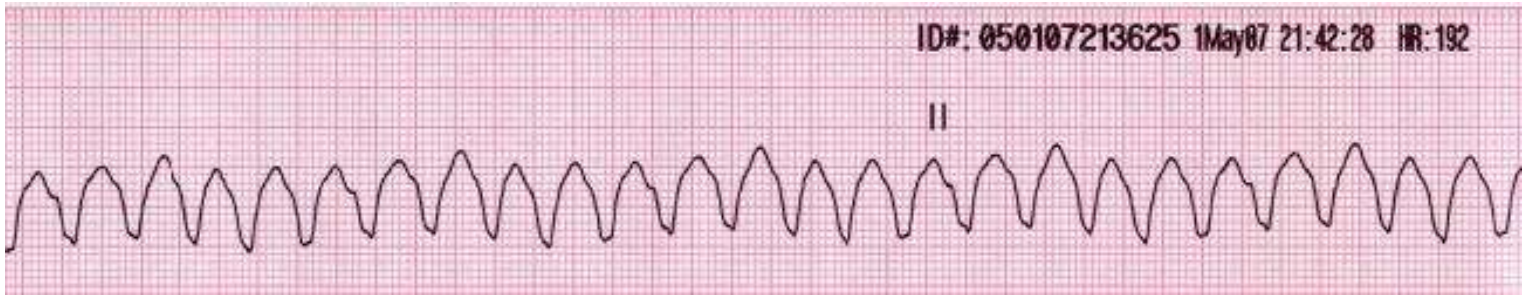

What is the rhythm?

What is the management?

Glenlarson, Wikimedia Commons

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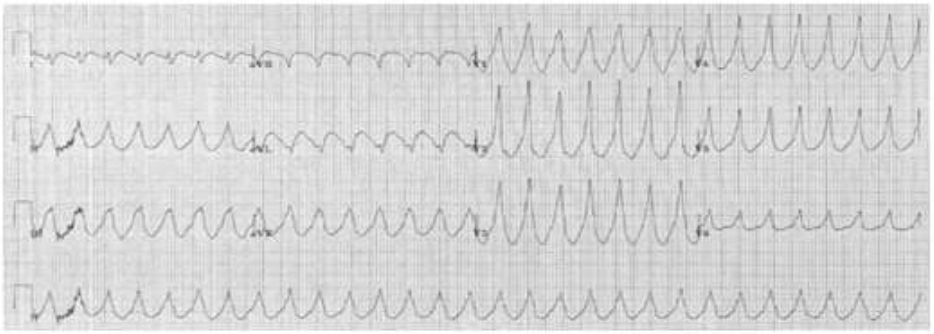
Ventricular Tachycardia



- Rapid and regular
- No P waves
- Wide QRS complexes

Ksheka, Wikimedia Commons
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Ventricular Tachycardia

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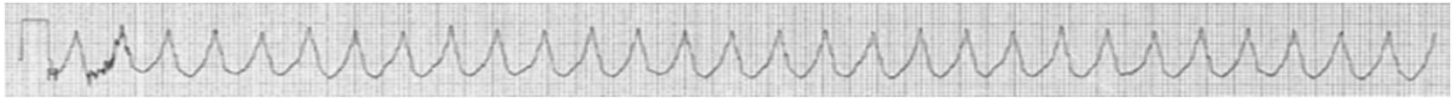
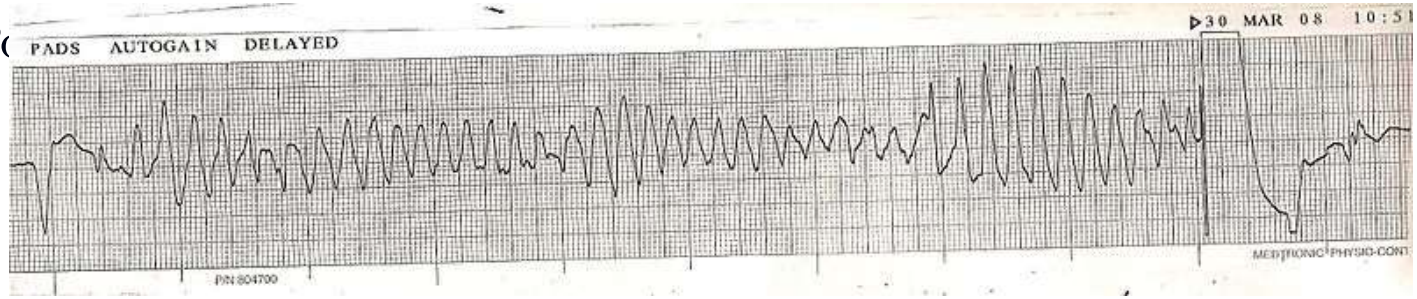
- Monomorphic VT



Ksheka, Wikimedia Commons

- P



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Case 4

72yr old with Altered Sensorium

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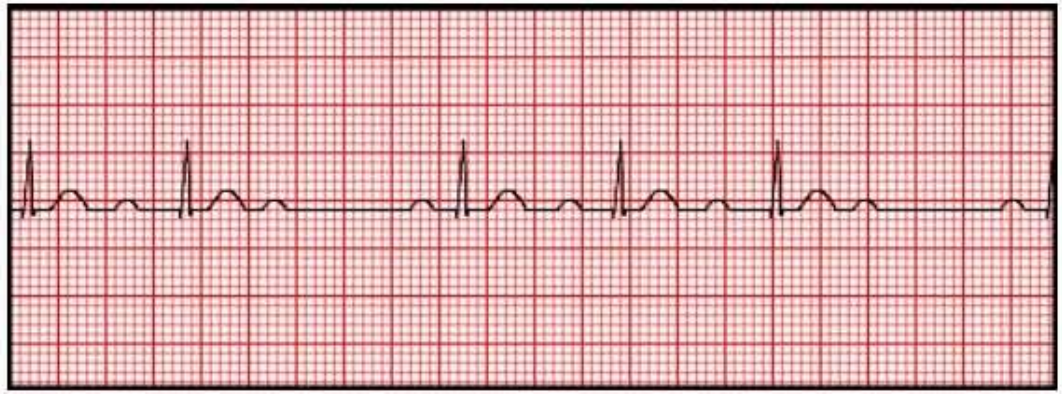
- Dizziness this morning and more confused through the day
- Bp- 84/58, hr- 44pm, rr-18cpm SPO2-90%



- **What arrhythmia is this?**

1. Second Degree Mobits Type II
2. First Degree AV Block
3. Second Degree Mobitx type 1
4. Third Degree AV Block

72yr old with Altered Sensorium

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- Dizziness this morning and more confused through the day
- Bp- 84/58, hr- 44pm, rr-18cpm SPO2-90%

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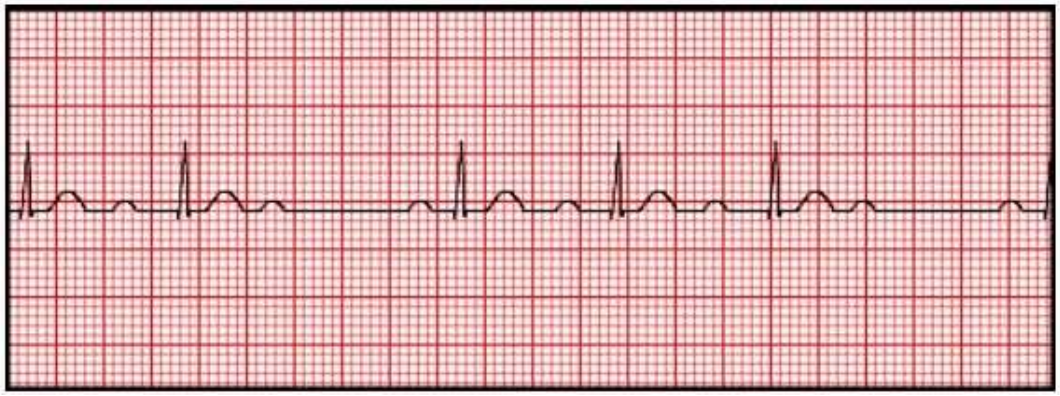
2. First Degree AV Block
3. **Second Degree Mobitz type 1**
4. Third Degree AV Block



Progressive PR Prolongation followed by non-conducted P wave

72yr old with Altered Sensorium

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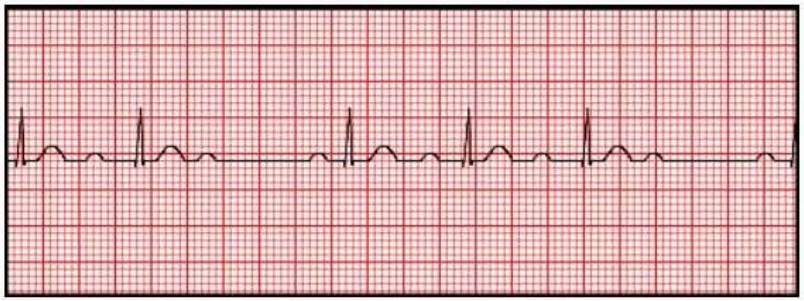
- Given the elevated RR and SPO2-90%



- **What is the next initial step in MGT?**

1. 2L of O2 via nasal cannula
2. Initiate CPAP
3. Endotracheal Intubation
4. Initiate BiPAP

72yr old with Altered Sensorium

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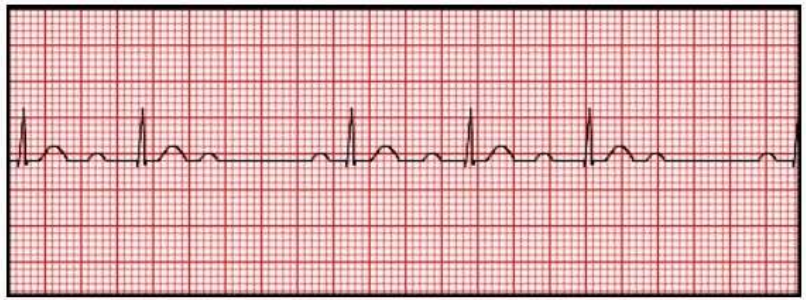
- Given the elevated RR and SPO2-90%



- **What is the next initial step in MGT?**

1. **2L of O2 via nasal cannula**
2. Initiate CPAP
3. Endotracheal Intubation
4. Initiate BiPAP

While not acutely in any respiratory distress, hypoxemia is a common cause of symptomatic bradycardia and initiation of 2L of O2 via nasal cannula is an appropriate initial measure for patients with an SaO2 <94%. Providers should ensure ongoing monitoring of respiratory status in individuals with symptomatic bradycardia, as they are at risk for developing pulmonary edema.

72yr old with Altered Sensorium

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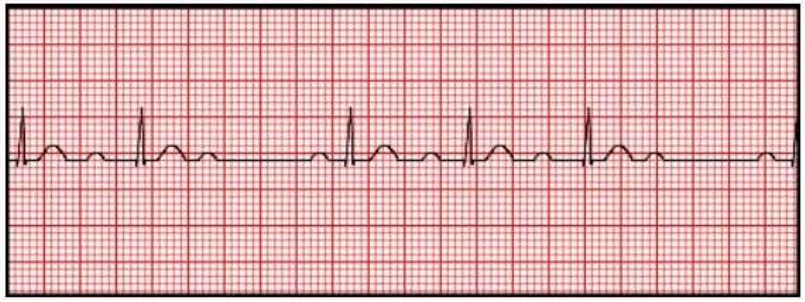
- Wife confirms that he's not any AV blocking medications.
- Bilateral IV Access obtained



- **What Medication can be given as initial therapy?**

1. 5mg bolus of Atropine
2. 5mg bolus of Nor-adrenaline
3. 0.5mg bolus of Atropine
4. 0.5mg bolus of Nor-adrenaline

72yr old with Altered Sensorium

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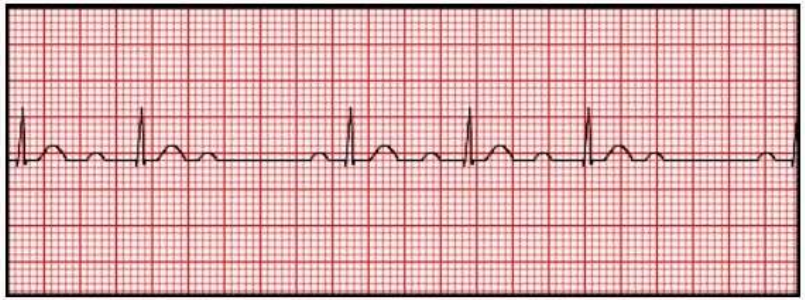

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72yr old with Altered Sensorium

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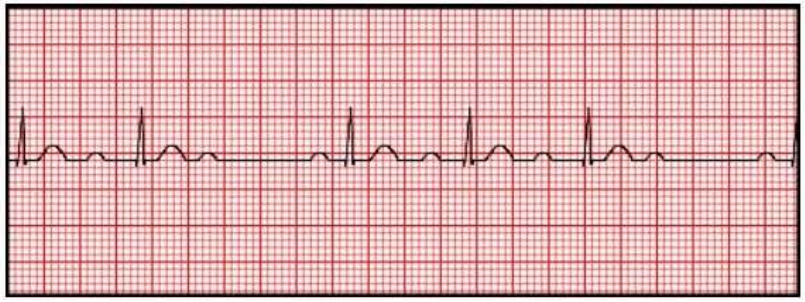
- 0.5mg bolus of Atropine was given, Heart Rate remains unchanged-45/min



- **While other interventions are prepare, at what dose and frequency can Atropine be given after initial dose?**

1. 0.5mg IV every 2mins
2. 0.5mg IV every 3-5mins
3. 1mg IV every 3-5mins
4. 1mg IV every 1-2mins

72yr old with Altered Sensorium

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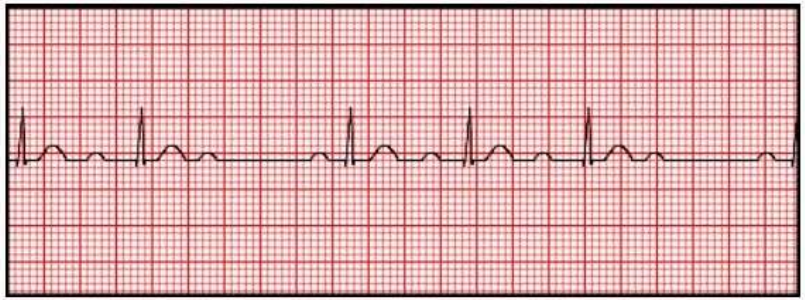

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2. 0.5mg IV every 3-5mins
3. **1mg IV every 3-5mins**
4. 1mg IV every 1-2mins

Total Atropine dose of 3mg
Further interventions should not be delayed for the administration of Atropine

72yr old with Altered Sensorium

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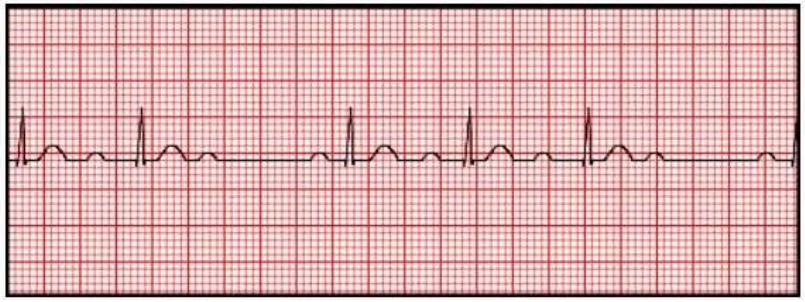
- A second dose of 0.5mg bolus of Atropine was given, Heart Rate increases transiently to 58/min but slowly reverts back to 41/min shortly after



- **The next best step is?**

1. Defibrillation
2. Synchronized Cardioversion
3. Extracorporeal Membrane Oxygenation (ECMO)
4. Transcutaneous Pacing

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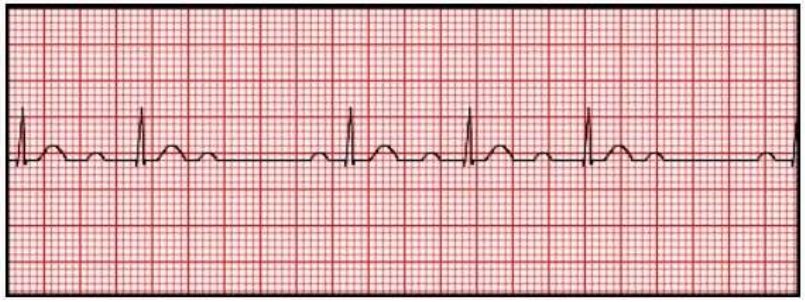

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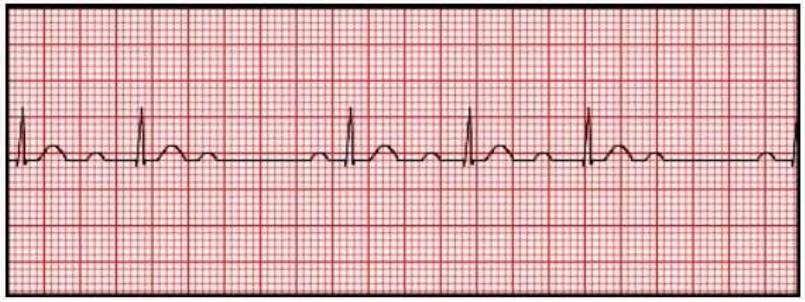

- **If Transcutaneous Pacing is Unavailable, what medication can be used as an alternative next best step?**

1. Noradrenaline at 2-10mcg/min
2. Dobutamine at 2-10mcg/min
3. Vasopressin at 2-10mcg/min
4. Adrenaline at at 2-10mcg/min

72yr old with Altered Sensorium

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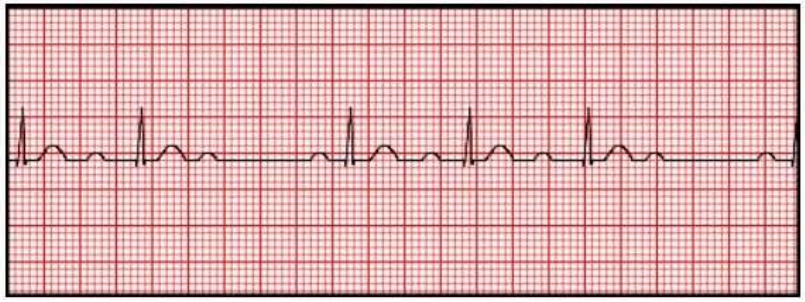

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4. **Adrenaline at 2-10mcg/min**

72yr old with Altered Sensorium

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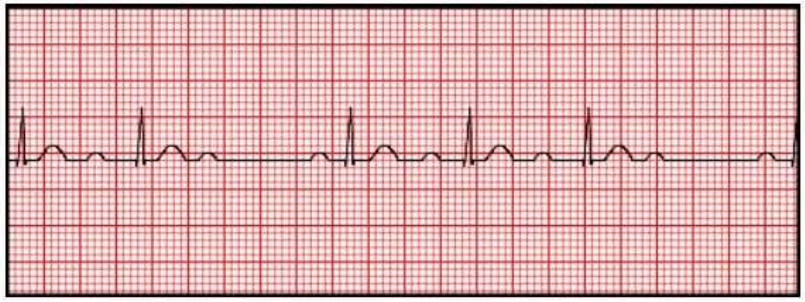
- An Adrenaline infusion of 3mcg/min is started
- There is mild improvement in vitals
- Remains symptomatic
- Cardiocare is called



- **The next best step is?**

1. Prepare for Cardiac Catheterization
2. Prepare for Transvenous Pacing
3. Placement of Patient on Heart Transplant List
4. Continue Transcutaneous Pacing

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72yr old with Altered Sensorium

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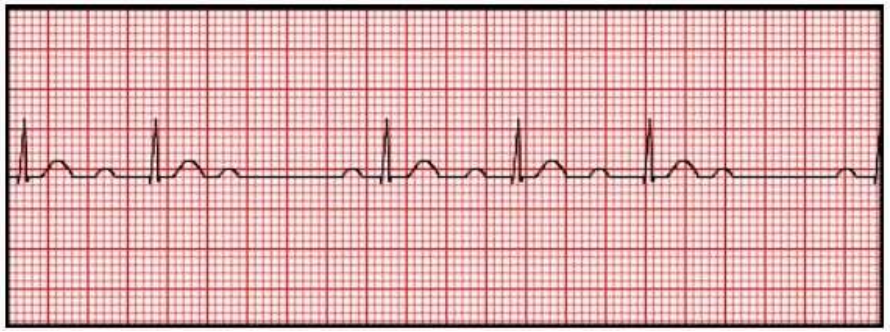

- **The next best step is?**

1. Prepare for Cardiac Catheterization
2. **Prepare for Transvenous Pacing**
3. Placement of Patient on Heart Transplant List
4. Continue Transcutaneous Pacing

Patients in which transcutaneous pacing and chronotropic agents do not resolve their symptoms should be prepared for transvenous pacing. Expert consultation should be made for further management and evaluation for the need of permanent pacemaker placement.

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Case 5

Pt arrives with diaphoresis, midsternal chest pain radiating to left arm and jaw.

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- **What are the best diagnostic / therapeutic first steps?***
  1. IV, chest xray, sl NTG, Arterial blood gas
  2. IV, CT scan chest , heparin
  3. IV, SL ntg , IV beta blocker
  4. IV, oxygen, 12 lead ekg, Give 4 (75mg) Aspirin tablets,

Pt arrives with diaphoresis, midsternal chest pain radiating to left arm and jaw.

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- **What are the best diagnostic / therapeutic first steps?***

1. IV, chest xray, sl NTG, Arterial blood gas
2. IV, CT scan chest , heparin
3. IV, SL ntg , IV beta blocker
4. **IV, oxygen, 12 lead ekg, Give 4 (75mg) Aspirin tablets,**

Aspirin reduces mortality and morbidity in ACS patients. 12 lead EKG should be performed with 10 minutes of arrival to ED/casualty. IV will facilitate rapid administration of fluids and medications.

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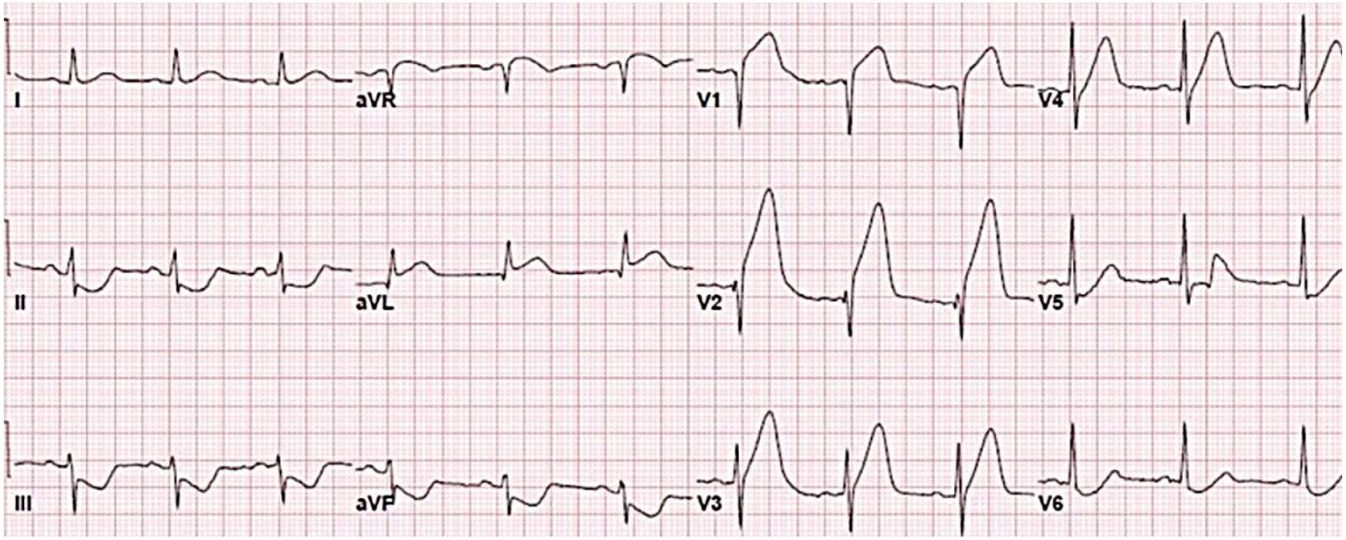
- Pt is a 54 y/o male, smoker, c/o chest heaviness, diaphoresis, nausea present to ED/casualty via Uber.
- IV placed an EKG has been done in Triage.



Interpret the ECG and choose the best therapies:*

1. NSTEMI, aspirin, statin, beta blocker and cardiology consult
2. Non-diagnostic EKG, admit for observation and stress test.
3. Acute inferior STEMI, SL ntg, morphine and beta blocker
4. Acute anterior STEMI, Aspirin, contact Cardiology for Lytic therapy or emergent cardiac angiography and intervention.

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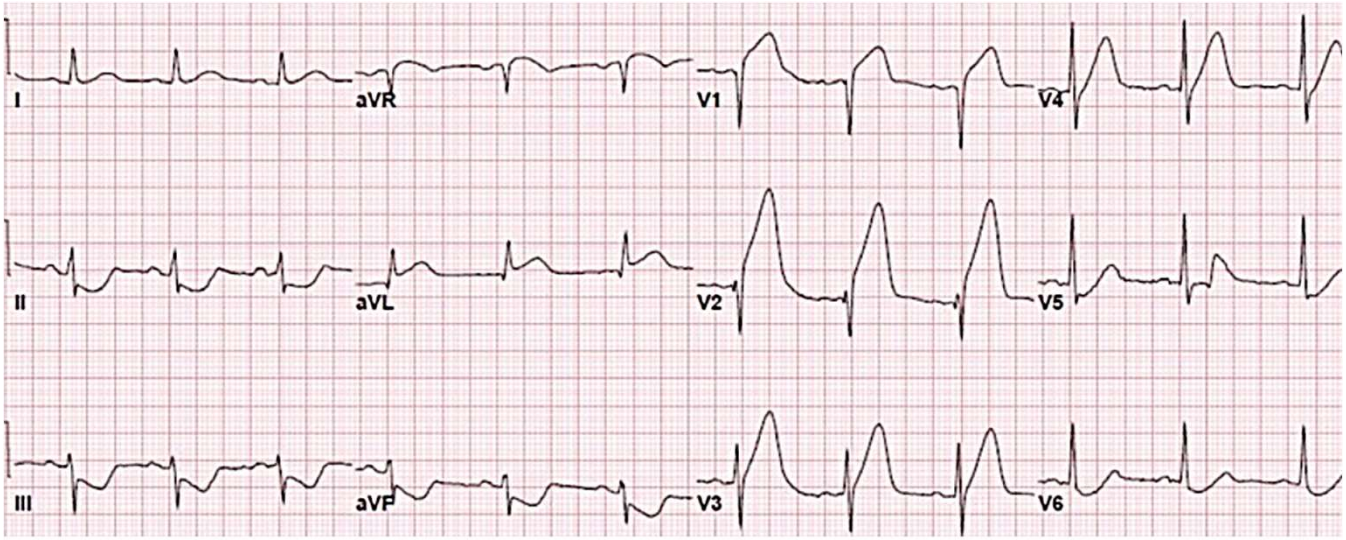

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2. Non-diagnostic EKG, admit for observation and stress test.
3. Acute inferior STEMI, SL ntg, morphine and beta blocker
4. **Acute anterior STEMI, Aspirin, contact Cardiology/CARDIOCARE for Lytic therapy or emergent cardiac angiography and intervention.**

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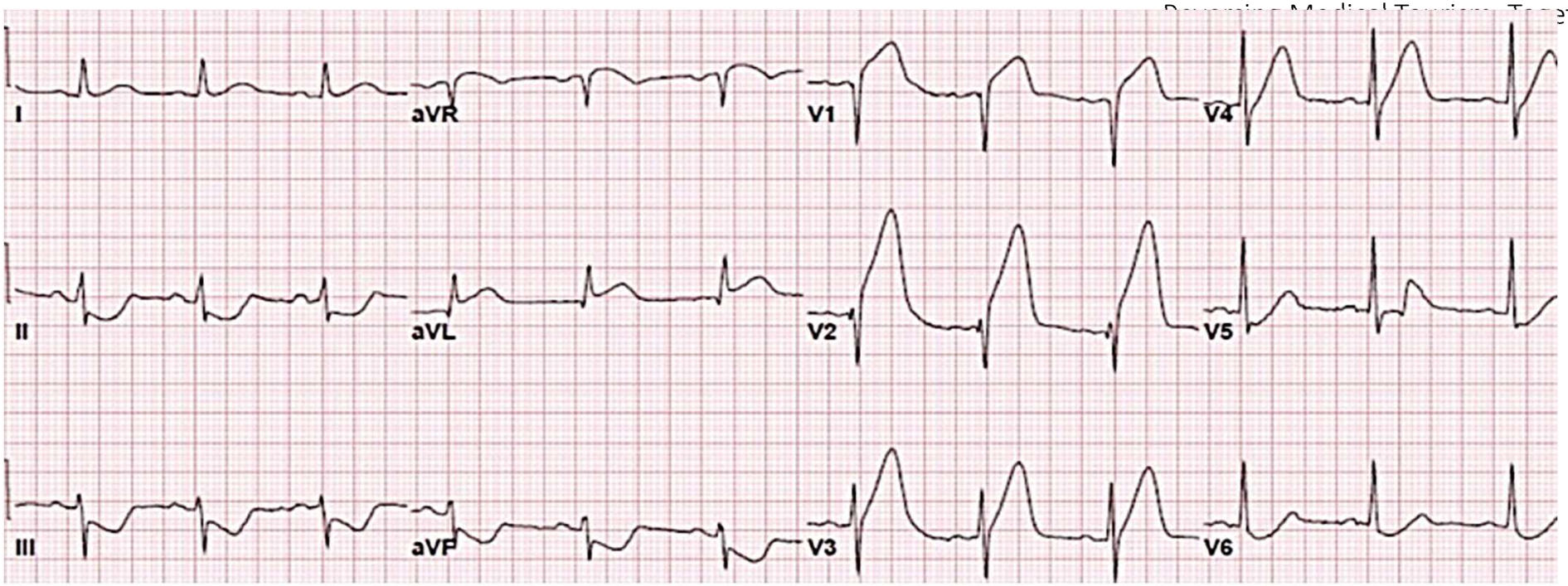

- ST elevation in leads V1-V4 with reciprocal ST depression in inferior (II,III,AVF).
- Aspirin, beta blocker if hypertensive, statin
- Cardiology/Cardiocare consult,
- Immediate consideration for thrombolysis or primary percutaneous coronary intervention (PCI).

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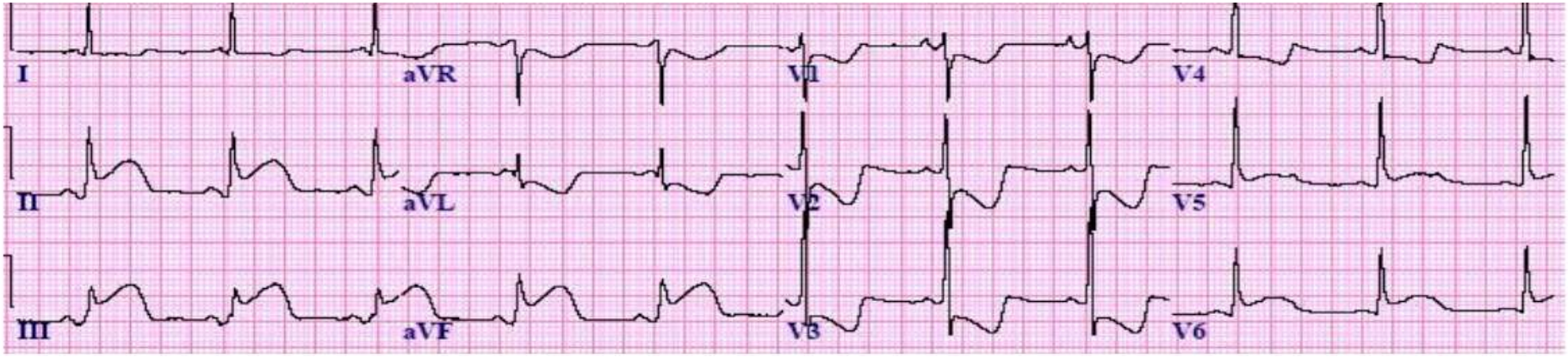
62 y/o woman with diabetes presents to ED/Casualty with epigastric discomfort, nausea and vomiting.
BP: 150/80 P: 85 R:22 O2: 100% Temp: 36.7

- After she is seen by the Surgical resident, she develops hypotension BP 90/50 and an ECG is performed.



- **What should be done urgently?***
  1. NSTEMI, aspirin, Beta blocker and heparin
  2. Inferior STEMI, aspirin, IV fluid bolus, cardiology consult
  3. Anterior STEMI, IV diuretics, SL NTG, IV beta blocker, lytic therapy
  4. Inferior STEMI, aspirin, iv diuretics, beta blocker , morphine and cardiology consult

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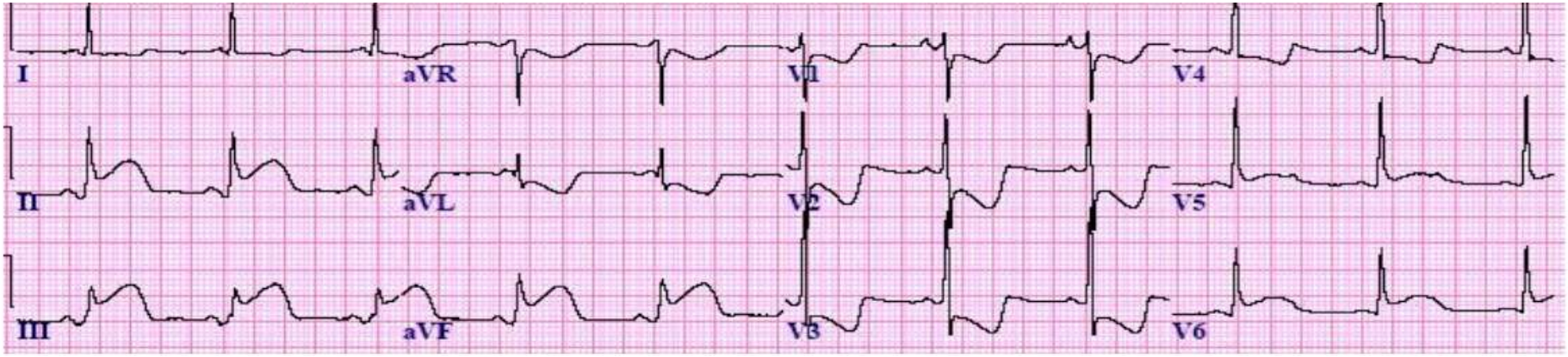

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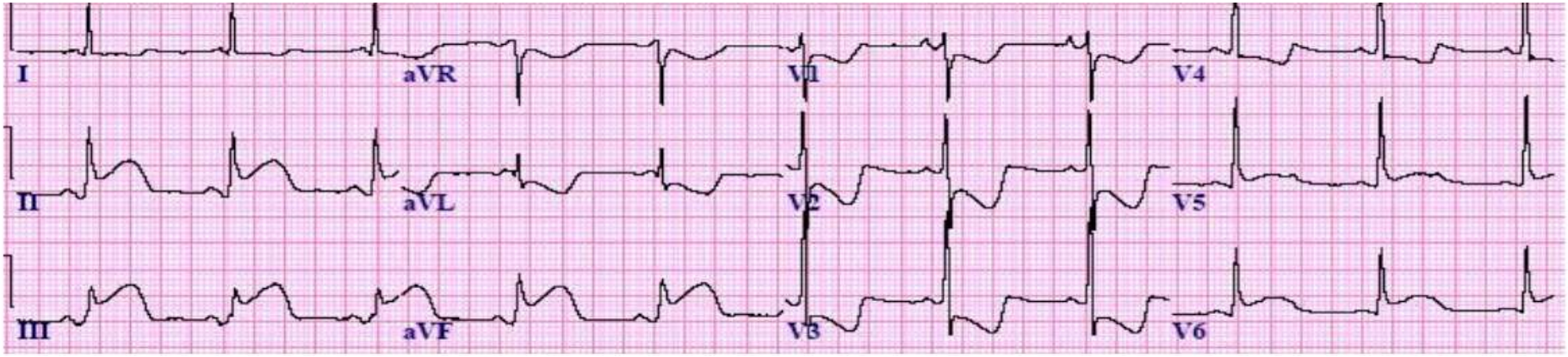

- ST elevation in leads II,III,AVF, V5,V6 ST depression V1-V4.
- Avoid nitrates and beta blockers in inferior STEMI
  - because of RV infarction and potential to cause cardiogenic shock.

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On the next rhythm check, the patient demonstrates the following rhythm:

- **She now has a palpable pulse but is hypotensive, unresponsive, and hypoxic.**

- **What are the next appropriate steps in management?***
  1. Cardiovert, prepare to intubate
  2. Intubate and give amiodarone
  3. Defibrillate, prepare to intubate
  4. Intubate and continue CPR

On the next rhythm check, the patient demonstrates the following rhythm:

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- **She now has a palpable pulse but is hypotensive, unresponsive, and hypoxic.**

- **What are the next appropriate steps in management?***
  1. **Cardiovert, prepare to intubate**
  2. Intubate and give amiodarone
  3. Defibrillate, prepare to intubate
  4. Intubate and continue CPR

- The patient has ventricular tachycardia with a pulse.
- **Defibrillating someone with a pulse is life threatening.**
- Defibrillation delivers electricity immediately whereas during cardioversion, avoids the vulnerable portion of repolarization and safely delivers a shock to convert to normal sinus.

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After cardioverting and intubating, you get an EKG which demonstrates the following:

- You re-assess the patient and cannot palpate a pulse.

- **What is the next step?***
  1. Epinephrine
  2. Amiodarone
  3. Defibrillate
  4. Cardiovert

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After cardioverting and intubating, you get an EKG which demonstrates the following:

- You re-assess the patient and cannot palpate a pulse.

- **What is the next step?***
  1. Epinephrine
  2. Amiodarone
  3. **Defibrillate**
  4. Cardiovert

Once the rhythm is identified as vfib or pulses vtach, it is imperative to defibrillate as soon as possible to increase chances of survival.

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SUMMARY

A.C.L.S STEPS

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Assessment- Primary and Secondary

1. **Basic Life Support/CPR**
2. **Crisis Resource Management**
3. **Rhythm Identification & Treatment**
   a. Electrotherapy: Cardioversion, Defibrillation, Pacing
   b. Medications
4. **Advanced Airway Management**
5. **Specialized Life Support***

ACLS

ASSESS & RE-ASSESS ALL OF THE FOLLOWING

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AIRWAY	BREATHING	CIRCULATION	DISABILITY	EXPOSURE

• Advanced Airway present?
• Advanced Airway needed?
• Proper placement of airway device?
• Tube Secured?
• Reconfirm placement frequently and with every transition
	• Adequate Ventilation?
	• Adequate Oxygenation?
	• Monitoring of the following?
	  • Quantitative Waveform Capnography
	  • Oxyhemoglobin Saturation
		• Effective Chest Compressions?
		• Cardiac Rhythm?
		• Need for Defibrillation or Cardioversion?
		• IV/IO access established?
		• ROSC?
		• Medications for BP or Rhythm needed?
		• Fluid resuscitation needed?
			• Neurologic Function
			• Responsiveness
			• Level of Consciousness
			• Pupil dilatation
			• AVPU: Alert, Voice, Painful, unresponsive
				• Expose to perform physical Examination
				• Look for signs of:
				  • Trauma
				  • Bleeding
				  • Burns
				  • Unusual markings
				  • Medical Alert bracelets

1. BLS RECAP

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Confirm Situation	Call for Help	Compressions	Airway & Ventilation	Defibrillation- AED ASAP!
Check Responsiveness	Extra hands	Firm Surface	30:2	Don't touch
			Chin Lift	
Check Pulse	Defibrillator	100-120c per min	Firm mask + Ambu Bag	Put off open oxygen
Check Breathing	Crash Cart	5cm depth	Avoid Hyperventilation	No wet chest surface
Check Safety	ACLS Team	Minimize Interruptions	Oxygen therapy	Follow Prompts
		Locked Palms + Straight Elbows		

7th Abuja Car

2. Crisis Resource Management

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- There are **three (3) Key Principles** of ACLS Crisis Resource Management:
  a. **Leadership**
  b. **Communication**
  c. **Preparation**

ACLS ECG Rhythms

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Cardiac Arrest *(no-pulse)* Rhythms	**1. Ventricular fibrillation/Pulseless Ventricular Tachycardia,**
	2. Pulseless Electrical Activity/Asystole
Non-Arrest *(pulse)* Rhythms	**1. Narrow- complex tachycardia**
	2. Wide-complex tachycardia,
	3. Bradycardia

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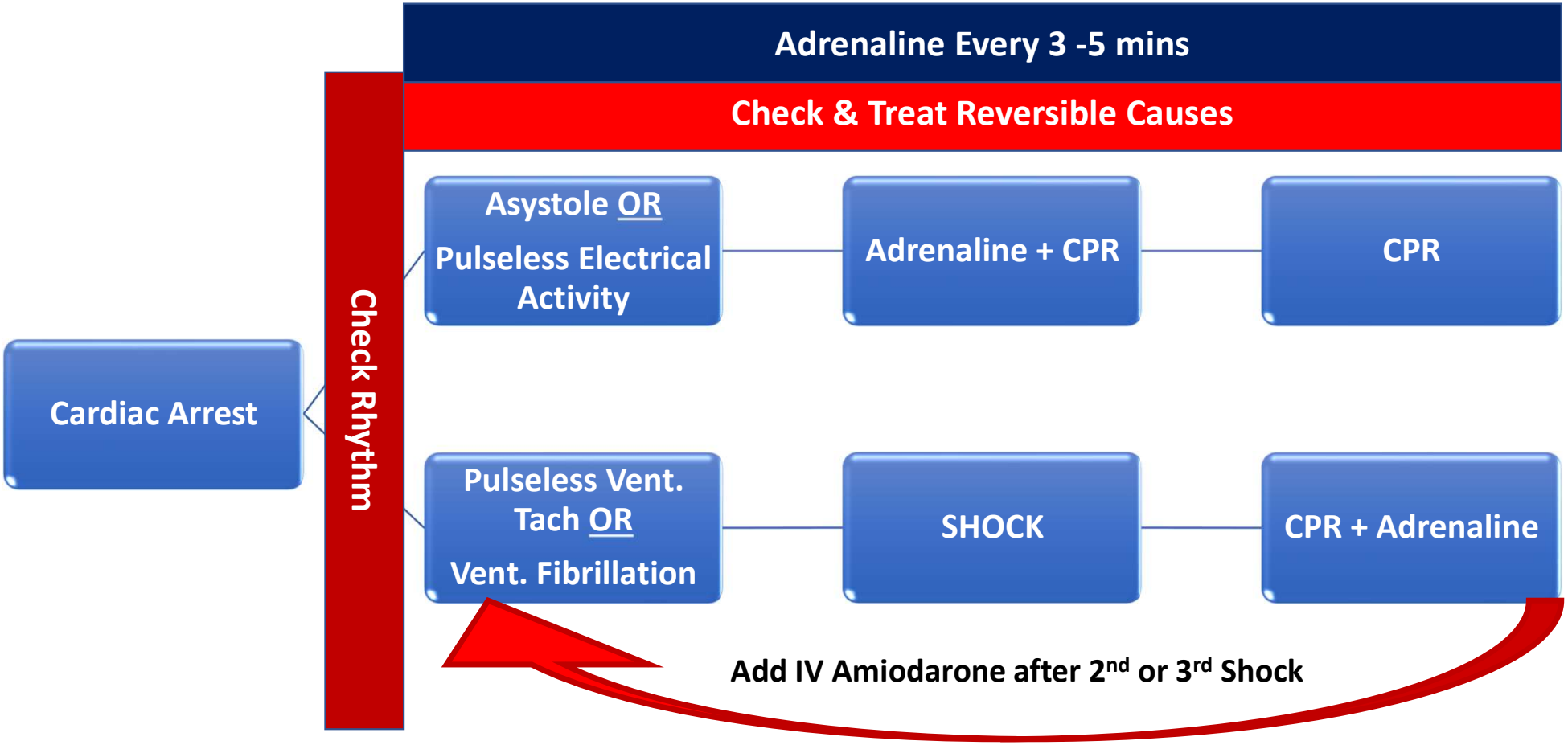

Adult Tachycardia + Pulse

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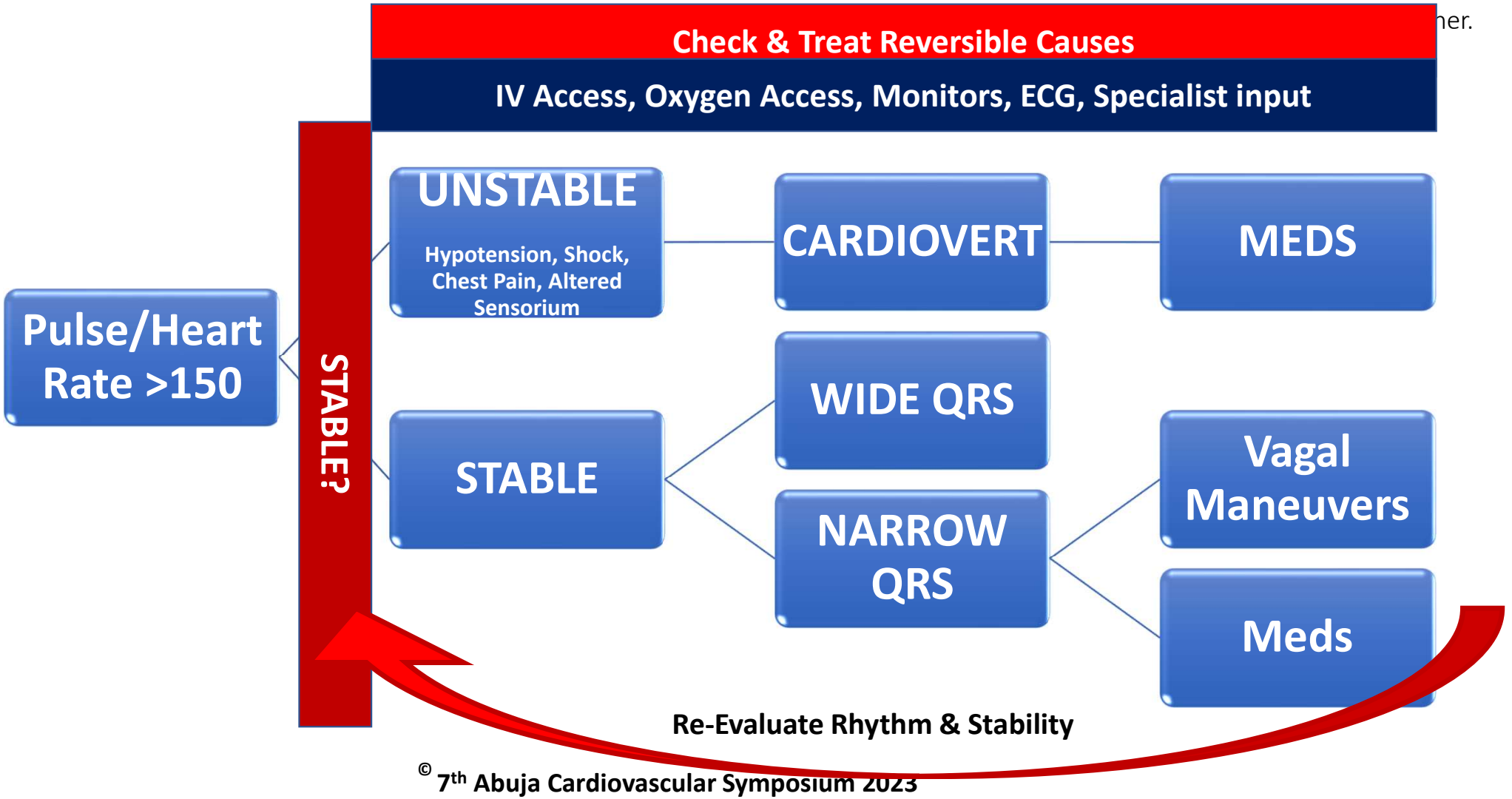

ACLS ECG Rhythm Summary

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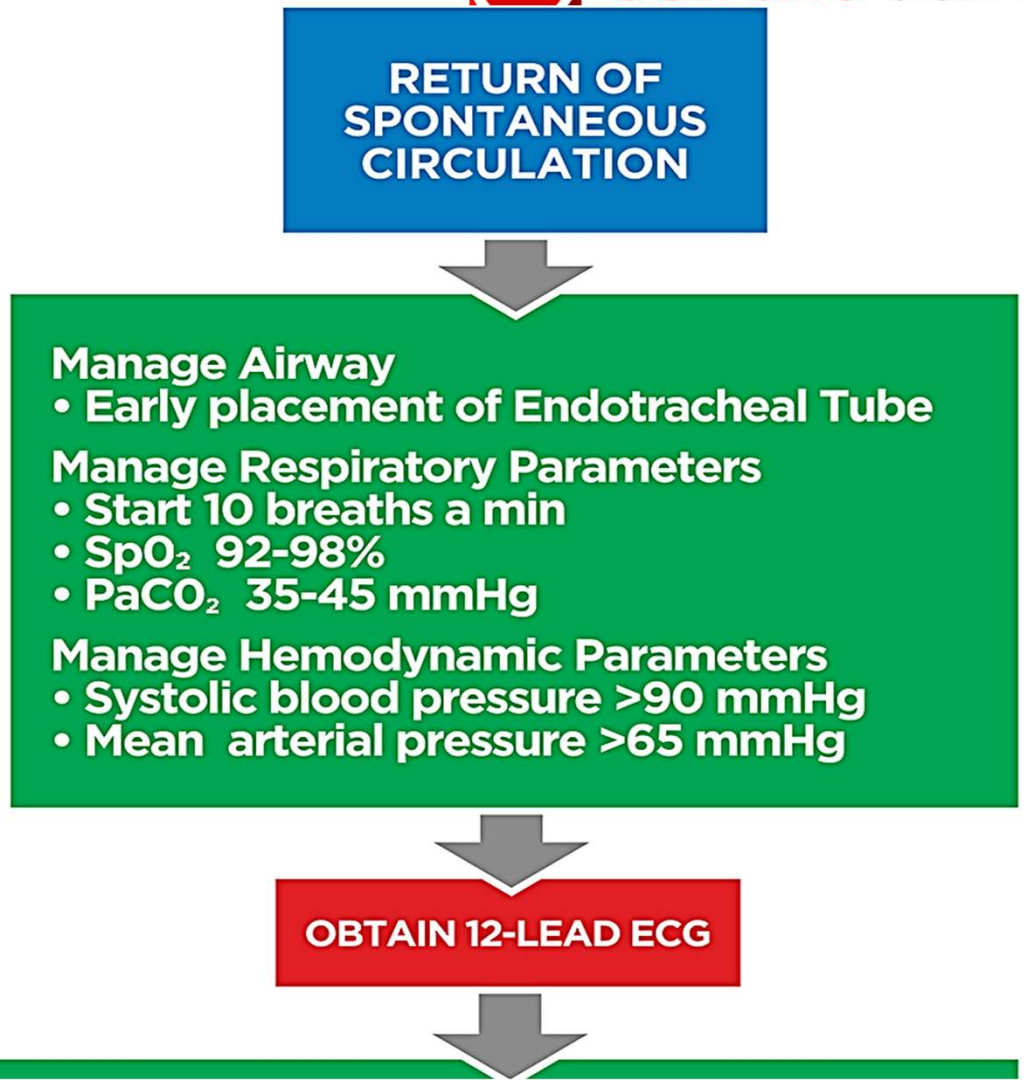
Cardiac Arrest Rhythms	1. Pulseless Ventricular Tachycardia	Shockable	1. Shock	3. Amiodarone or Lidocaine	CHECK AND TREAT ANY OF THE 5Hs AND Ts
	2. Ventricular Fibrillation		2. CPR	4. Adrenaline	
	3. Pulseless Electrical Activity	Non-Shockable	1. CPR		
	4. Asystole		2. Adrenaline	3. Atropine	
Non-Arrest Rhythms	1. Wide Complex Tachy	Stable	Medications		
		Unstable	Cardiovert	Medications	
	2. Narrow Complex Tachy	Unstable			
		Stable	Vagal Maneuvers	Medications	
	3. Bradycardia	Stable	Monitor, Check reversible causes	Prepare for permanent pacing	
		Unstable	Meds(Atropine, Adrenaline, Dopamine)	Transcutaneous or Temporary Pacing	

UNSTABLE = Hypotension, Shock, Chest Pain, HF, Altered Sensorium

ADULT IMMEDIATE POST CARDIAC ARREST ALGORITHM



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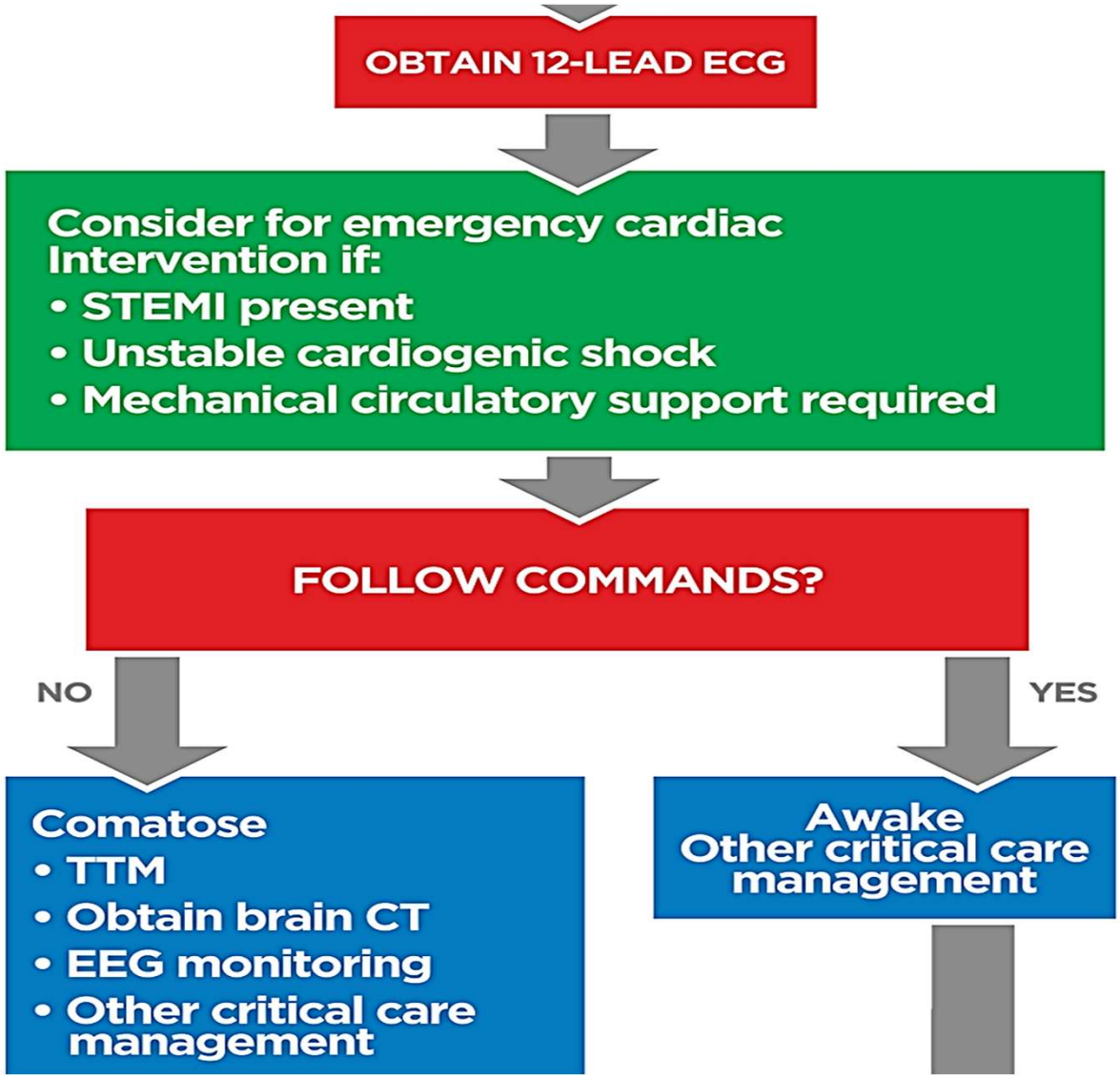
ADULT IMMEDIATE POST CARDIAC ARREST ALGORITHM (2)



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Thank you