ACLS Pharmacology

CAR-506

Beth Torres, PhD, RN, CCRN

November 12, 2015

Virginia EMS Symposium

NOTE: The handout given during the presentation had a typo on slide 8. The dose of epinephrine drip is corrected in this handout.

HCA Chippenham & Johnston-Willis Hospitals

Objectives

At the end of the session, the participant will

- List commonly administered ACLS medications and when to use them
- Describe how these ACLS medications work in the body

Removed from the 2010 PEA/Asystole algorithm since the use of this drug is unlikely to have a beneficial effect.

- What is ATROPINE?

Atropine

- **Indication:** Symptomatic bradycardia
- **Dose:**
  - 0.5mg IV every 3-5 min
  - Max. 0.04mg/kg (3 mg total)
- **Precautions:**
  - Often not effective in Mobitz Type II or 3° AVB with a wide QRS
  - Avoid in hypothermic bradycardia
  - Use caution in AMI. Increases myocardial demand.

First drug listed in all algorithms

- What is OXYGEN?

Oxygen

- **Indications:** Any suspected cardiopulmonary emergency
  - SOB
  - ACS/AMI
  - Stroke
  - SaO2 < 94%
- **Precautions:**
  - Avoid hyperoxygenation
  - Pulse ox may be inaccurate in low perfusion states

All dead people get _____

- What is EPINEPHRINE or VASOPRESSIN (2010)?

Epinephrine

- **Indications:** Cardiac Arrest; Symptomatic Bradycardia; Anaphylaxis, severe allergic reactions
- **Dose:**
  - IV/IO: 1mg (10ml of 1:10,000 solution) every 3-5 min.
  - Continuous infusion (brady/hypotension): 2-10mcg/min

Epinephrine

- ***2015 Recommendations—Updated***
  - It may be reasonable to administer epinephrine as soon as feasible after the onset of cardiac arrest due to an initial nonshockable rhythm (Class IIb, LOE C-LD).
  - Insufficient evidence to recommend optimal timing for shockable rhythms.

Epinephrine

How it works

- Vasoconstriction by binding to alpha-1 adrenergic receptors of the blood vessels (arteries and veins) thus improving perfusion pressure to the brain and heart.
- Cardiac Output: binds to beta-1-adrenergic receptors of the heart. It improves cardiac output by:
  - Increasing heart rate
  - Increasing heart muscle contractility
  - Increasing conductivity through the AV node

Vasopressin

- **Indications:** Can replace 1st or 2nd dose of epinephrine (2010)
- **Dose:** 40 units IV/IO x1 dose
- **How it works:** raises blood pressure by inducing moderate vasoconstriction
- ***2015 Recommendation—Updated***
  - Vasopressin offers no advantage as a substitute for epinephrine in cardiac arrest (Class IIb, LOE B-R).
  - Vasopressin removed from the Adult Cardiac Arrest Algorithm

Patient complaining of palpitations. BP 138/76

- What are ADENOSINE or BETA BLOCKERS?

Adenosine

- **Indications:**
  - Stable, narrow QRS SVT
  - Unstable, narrow QRS SVT while awaiting cardioversion
  - Stable regular, monomorphic WCT with pulse
- **Dose:** 6mg IVP over 1-3 sec; followed by a 20ml NS bolus; repeat with 12mg in 2 min if needed
- **How it works:** works on the potassium channels in the atrial and sinoatrial node to slow the HR; blocks AV node conduction

Beta Blockers

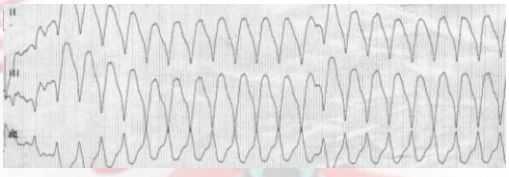
- **Indications:** to convert to NSR or to slow rapid ventricular response in SVT.
- **Second line** drug after ADENOSINE
- **Dose: Metoprolol:** 5 mg slow IVP; repeat in 5 min (Max 15 mg total)
- **How it works:** in low doses, selectively blocks beta$_1$-adrenergic receptors in the heart and vascular smooth muscle; reduce ischemic injury

Patient awoke complaining of palpitations. BP 142/86

- What is CALCIUM CHANNEL BLOCKER?

Calcium Channel Blocker

- **Indications:** Control ventricular rate in atrial fib & atrial flutter; use after Adenosine to treat stable, refractory narrow complex SVT
- **Dose: Diltiazem:** 15-20mg (0.25mg/kg) IV over 2 minutes. May repeat in 15 min with 20-25mg (0.35mg/kg) over 2 min.
- **How it works:**
  - inhibits calcium channels in the SA and AV nodes;
  - inhibits conduction through the AV node;
  - dilation of the coronary and systemic arteries and improved oxygen delivery to the myocardial tissue

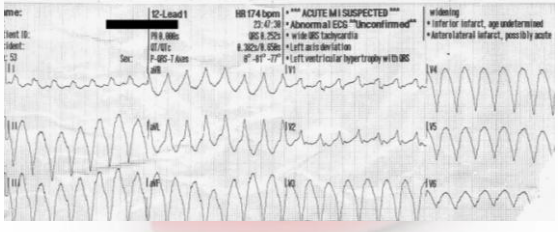


Patient complaining of chest pain. BP 80/40

What is SYNCHRONIZED CARDIOVERSION?

What if the patient were stable?

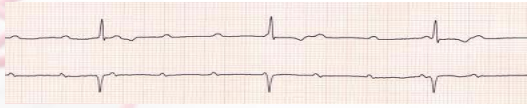
- Do a 12 Lead ECG



What is AMIODARONE?

Amiodarone

- **Indications:** With expert consultation, may be used for atrial and ventricular dysrhythmias; VF/Pulseless VT
- **Dose:**
  - With Pulse: 150mg IV over 10 min. May repeat 150mg in 10 min if needed
  - Pulseless: 300mg IV/IO push; repeat 150mg IV/IO if needed
- **Precautions:** Rapid infusion can lead to hypotension; prolonged QTc



Patient c/o SOB. BP 82/56

- What is DOPAMINE or EPINEPHRINE gtt?

Symptomatic BRADYCARDIA

- S/S of hypoperfusion related to the HR
- Treat with BrADE
  - Atropine
  - Dopamine
  - Epinephrine

Dopamine

- **Indications:**
  - Second-line drug for symptomatic bradycardia (after atropine)
  - Hypotension (SBP ≤ 70 to 100mgHg) with s/s of shock
- **Dose:** 2-20mcg/kg/min
- **Precautions:**
  - "Fill the tank first" Treat hypovolemia
  - Can cause tachycardia

Dopamine IV Infusion

Add 400mg of Dopamine to 250ml NS (1600mcg/ml); Use 60 gtts IV tubing							
	Weight in Kg						
mcg/kg	50 kg 110 lb	60 kg 132 lb	70 kg 154 lb	80 kg 176 lb	90 kg 198 lb	100 kg 220 lb	125 kg 275 lb
2 mg	4	5	5	6	7	7	9
5 mg	9	11	13	15	17	19	23
10 mg	19	23	26	30	34	38	47

RAA. (2012) Patient Care Protocol

65 yo female patient complaining of SOB, nausea, fatigue.

- What is OXYGEN, ASA, NTG, & MORPHINE?

ASA

- **Indications:** ACS; AMI
- **Dose:** 160-325mg chewed
- **Precautions:** True aspirin allergy; recent GI bleeding
- **How it works:** inhibits platelet aggregation and vascular smooth muscle contraction

Nitroglycerin (NTG)

- **Indications:** Angina (ischemic pain); AMI; CHF
- **Dose:**
  - **IV:** 10mcg/min; increase by 10mcg/min every 3-5 min until pain relieved; Max. 200mcg/min
  - **SL:** 1 tab (0.3-0.4mg) every 5 min until pain relieved; Max. 3 tab
  - **Spray:** 1-2 sprays for 0.5-1 sec every 5 min until pain relieved; Max. 3 sprays in 15 min.
- **Do not give if:** BP < 90; HR < 50 or >100; RV infarction; if patient has used erectile dysfunction meds in last 24 hours.

Morphine Sulphate

- **Indications:** CP unresponsive to nitrates; acute pulmonary edema
- **Dose:**
  - **STEMI:** 2-4 mg IV. May repeat 2-8mg at 5-15 min intervals
  - **UA/NSTEMI:** 1-5 mg IV
- **Precautions:** Administer slowly; May cause hypotension in volume-depleted patients; RV infarction
- **How it works:**
  - Analgesia is mediated through changes in the perception of pain at the spinal cord and higher levels in the CNS
  - Vasodilatory effects: inhibits vasopressin; ↑ release of histamine

What is DEFIB→EPI → MAGNESIUM?

CPR CPR

MAGNESIUM

- **Indications:** Torsades de pointes; suspected hypomagnesemia; life-threatening dysrhythmias due to dig toxicity
- **Dose:** 1-2 gram diluted in 10ml D5W IV/IO
- **Precautions:** BP may decrease if given too rapidly; renal failure
- **How it works:** Spector et al postulated that magnesium is effective via its ability to decrease calcium uptake and decrease potassium efflux at the myocardial cell membrane.

Questions?

Beth Torres, PhD, RN, CCRN
Beth.Torres@hcahealthcare.com

HCA Chippenham & Johnston-Willis Hospitals