

Question 3

47-year-old male presenting to the emergency department (ED) via emergency medical services (EMS) transport from home for altered mental status and new onset palpitations. The patient has a past medical history of hypertension taking amlodipine. Her presenting vital signs include BP 60/32 mm Hg, HR 161 beats/min, RR 21 breaths/min, and temperature 38.9°C. A 12-lead ECG reveals a wide complex tachycardia with an irregular rhythm with prolonged QT interval that is identified as polymorphic ventricular tachycardia. Which of the following interventions would be the best initial option for acute management in this patient?

- a. Magnesium sulfate 2 gm IV over 10 minutes
 - b. Procainamide 15 mg/kg IV bolus
 - c. **Non-synchronized defibrillation**
 - d. Amiodarone 300 mg IV over 10 minutes
- Explanation: Due to the blood pressure and altered mental status this patient would be classified as unstable. The ACLS Guidelines recommend defibrillation is indicated for unstable polymorphic ventricular tachycardia. Torsades is not treatable with procainamide, sotalol, and amiodarone anti-arrhythmic medications, which can themselves prolong the QT interval and promote the arrhythmia. Magnesium can be utilized during the resuscitation but does not take priority of defibrillation in a unstable or pulseless patient.
 - Source: Panchal AR, Bartos JA, Cabañas JG, Donnino MW, Drennan IR, Hirsch KG, Kudenchuk PJ, Kurz MC, Lavonas EJ, Morley PT, O'Neil BJ, Peberdy MA, Rittenberger JC, Rodriguez AJ, Sawyer KN, Berg KM; Adult Basic and Advanced Life Support Writing Group. Part 3: Adult Basic and Advanced Life Support: 2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation*. 2020 Oct 20;142(16_suppl_2):S366-S468. doi: 10.1161/CIR.0000000000000916. Epub 2020 Oct 21. PMID: 33081529.

Question 6

The emergency medical service brought a 25-year-old man to the emergency department. The patient has a history of bipolar disorder complicated by multiple substance use. He was found downstairs in his apartment at the bottom of the stairs lying on his left arm. He was last seen a few hours ago by his roommate. He is disoriented and unable to answer any questions, but is breathing on his own. His vital signs are HR 55, T 96.5, RR 18, BP 110/75. You decide to obtain an EKG that shows peaked T waves. What is the next best step in the management of this patient?

A. Intubation

- B. Epinephrine
- C. Albuterol
- D. Insulin
- E. Calcium gluconate

Correct E

- A patient brought to the emergency department after prolonged compression of the left upper extremity with an ECG significant for peaked T waves is indicative of crush syndrome leading to hyperkalemia. The next best step is to administer calcium gluconate to prevent global depolarization of the myocardium while correcting its electrolyte abnormalities.
- Hyperkalemia is a potentially life-threatening electrolyte problem that can be a complication of diseases including renal failure, acidosis, ingestion toxicity, lupus, and tumor lysis syndrome. It normally presents on the EKG as peaked T waves, followed by QRS prolongation leading to AV blocks, and finally resembling sine waves indicating impending cardiac arrest.
- ECG shows peaked T waves significant for hyperkalemia.

Incorrect answers:

- Answer A: The patient is breathing on his own and protecting his airway. This patient does not need to be intubated.
- Answer B: Epinephrine is the treatment of choice for anaphylaxis and would lower potassium in this patient, but it has a slower onset than calcium gluconate in protecting myocytes.
- Answers C and D: Both albuterol and insulin should be given when needed, but they have a slow onset during which cardiac complications can occur.

Question 11.

1. A 50-year-old man was treated with heparin. He reports blood in his urine. His doctor immediately stops the heparin infusion, sends labs, and administers medication to counter heparin toxicity. What is the mechanism of action for the reversal agent for heparin?
 - A. Directly neutralizing heparin
 - B. Increase in hepatic metabolism of heparin
 - C. Increase in renal metabolism of heparin
 - D. Increase coagulation to stop bleeding

Correct answer: A

- Explanation:-
- Treatment of heparin toxicity

- Withhold heparin for 1 to 2 hours and restart at a reduced rate dose may reverse mild excessive anticoagulation.
- Severe overdose may require administration of protamine.
- Protamine combines with heparin and neutralizes it: 1 mg of protamine neutralizes 100 For heparin. When protamine is administered in the presence of heparin (strongly acidic and negatively charged), a stable salt is formed and the anticoagulant activity of both drugs is nullified.
- Protamine should be given slowly, intravenously over 10 minutes. The maximum dose of protamine is 50 mg in any 10-minute period.

Question 15

AB is a 65-year-old man presents to the emergency department (ED) with severe shortness of breath, tachypnea, altered mental status, and diaphoresis. Vital signs are as follows: blood pressure 88/54 mm Hg, respiratory rate 26 breaths/minute, heart rate 53 beats/minute, pain score 2/10, and temperature 37.8°C. AB lab test results include Na 149 mEq/L, K+ 4.1 mEq/L, Cl 101 mEq/L, CO₂ 22 mEq/L, SCr 1.1 mg/dL (baseline 1.0 mg/dL), BUN 15 mg/dL, and glucose 126 mg/dL. AB is 5'8" tall and weighs 150 lb. The patient has been experiencing intermittent bradycardia on telemetry. Which would be the most appropriate regimen to initiate for this patient?

- e. Direct Cardioversion
- f. Transcutaneous pacing
- g. Epinephrine 1 mg Q3-5 min
- h. Atropine 1 mg q 3 -5 mins**

- Explanation: The 2020 ACLS guides recommend that in patients with hypotension or altered mental status receive atropine 1 mg q3-5 minutes with a maximum dose of 3 mg. Direction cardioversion would be for unstable tachyarrhythmias. Epinephrine would be an option after atropine is ineffective but would not be 1 mg q 3- 5 minutes and would be an infusion starting at 2-10 mcg/min.
- Source: Link MS, Atkins DL, Passman RS, Halperin HR, Samson RA, White RD, Cudnik MT, Berg MD, Kudenchuk PJ, Kerber RE. "Part 6: electrical therapies: automated external defibrillators, defillation, cardioversion, and pacing: 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care". *Circulation*. 2010; 122(suppl 3):S706-S719. http://circ.ahajournals.org/content/122/18_suppl_3/S706

Adult Bradycardia Algorithm

