ECG Analysis

Name the following rhythms from the list below:

- Normal Sinus Rhythm NSR
- Sinus Tachycardia
- Supraventricular Tachycardia SVT
- Fine Ventricular Fibrillation
- Monomorphic VTach
- 2nd degree I Block
- 3rd degree block
- Sinus Bradycardia
- Atrial Flutter
- Atrial Fibrillation
- Coarse Ventricular Fibrillation
- Polymorphic VTach (Torsades)
- 2nd degree II Block
- Asystole

1.

2.

3.

4.
Name the following rhythms from the list below:

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- 2<sup>nd</sup> degree I Block
- 3<sup>rd</sup> degree block

- Sinus Bradycardia
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- Asystole

10.

11.

12.

13.

14.
Name the following rhythms from the list below:

Normal Sinus Rhythm NSR
Sinus Tachycardia
Supraventricular Tachycardia SVT
Fine Ventricular Fibrillation
Monomorphic VTach
2\textsuperscript{nd} degree I Block
3\textsuperscript{rd} degree block

Sinus Bradycardia
Atrial Flutter
Atrial Fibrillation
Coarse Ventricular Fibrillation
Polymorphic VTach (Torsades)
2\textsuperscript{nd} degree II Block
Asystole
Pharmacology

21. Which of the following is most accurate regarding the administration of vasopressin during cardiac arrest?
   a. Vasopressin is indicated for VF and pulseless VT prior to the delivery of the first shock
   b. The correct dose of Vasopressin is 40 U administered IV or IO
   c. Vasopressin is recommended instead of epinephrine for the treatment of asystole
   d. Vasopressin can be administered twice during cardiac arrest

22. Your patient has been intubated. IV/IO access is not available. Which combination of drugs can be administered by the endotracheal route of administration?
   a. Amiodarone, lidocaine, epinephrine
   b. Epinephrine, vasopressin, amiodarone
   c. Lidocaine, epinephrine, vasopressin
   d. Vasopressin, amiodarone, lidocaine

23. Which of the following statements about the use of magnesium in cardiac arrest is most accurate?
   a. Magnesium is indicated for VF/pulseless VT associated with torsades de pointes
   b. Magnesium is indicated for shock-refractory monomorphic VT
   c. Magnesium is contraindicated in VT associated with a normal QT interval
   d. Magnesium is indicated for VF refractory to shock and amiodarone or lidocaine.

24. A patient with a possible acute coronary syndrome has ongoing chest discomfort unresponsive to 3 sublingual nitroglycerine tablets. There are no contraindications and 4 mg of morphine sulfate was administered. Shortly, BP falls to 88/60 and the patient complains of increased chest discomfort. You would:
   a. Give an additional 2 mg of morphine sulfate
   b. Start dopamine at 2 μg/kg per minute and titrate to BP 100 systolic.
   c. Give nitroglycerin 0.4 mg sublingually
   d. Give normal saline 250 mL to 500 mL fluid bolus

25. A patient has a rapid irregular wide-complex tachycardia. The ventricular rate is 138. He is asymptomatic with a BP of 110/7-. He has a history of angina. Which of the following actions is recommended?
   a. Give lidocaine 1-1.5 mg IV bolus
   b. Immediate synchronized cardioversion
   c. Seek expert consultation
   d. Give adenosine 6 mg IV bolus

26. A 62 year-old man suddenly began to experience difficulty speaking and left-sided weakness. He is brought to the ER. He meets initial criteria for fibrinolytic therapy and a CT scan of the brain is ordered. Guidelines for antiplatelet and antithrombotic therapy are:
   a. Administer heparin if CT scan is negative for hemorrhage
   b. Give aspirin 160 mg and clopidogrel 75 mg orally
   c. Administer aspirin 160-325 mg orally chewed, immediately
   d. Do not give aspirin for at least 24 hours if tPA is administered
27. A patient is in cardiac arrest. VFib has been refractory to an initial shock. Two attempts at peripheral IV have been unsuccessful. The next recommended access route of administration for the delivery of drugs during CPR is:

a. External jugular vein
b. Femoral vein
c. Intraosseous
d. Endotracheal

28. A patient with an ST-segment elevation MI has ongoing chest discomfort. Fibrinolytic therapy has been ordered. Heparin 4000 U IV bolus was administered and a heparin infusion 100 U per hour is being administered, and Aspirin was not taken by the patient because he had a history of gastritis treated 5 years ago. Your next action is to:

a. Substitute clopidogrel 300 mg loading dose
b. Give aspirin 160 – 325 mg chewed, immediately
c. Give 75 mg enteric-coated aspirin only
d. Give 325 mg enteric-coated aspirin rectally

29. A patient with possible ACS and a bradycardia of 42/min has ongoing chest discomfort. What is the initial dose of atropine?

a. Atropine 0.5 mg
b. Atropine 1.0 mg
c. Atropine 0.1 mg
d. Atropine 3 mg

30. A patient is in cardiac arrest. VFib has been refractory to an initial shock. Of the following, which drug and dose should be administered first by IV/IO route?

a. Atropine 1 mg
b. Epinephrine 1 mg
c. Vasopressin 20 U
d. Sodium bicarbonate 50 mEq

31. A 35-year old woman has palpitations, lightheadedness, and a stable tachycardia. The monitor shows a regular narrow-complex QRS at a rate of 180/min. Vagal maneuvers have not been effective in terminating the rhythm. An IV has been established. What drug should be administered IV?

a. Epinephrine 2-10 ug/kg per minute
b. Atropine 0.5 mg
c. Lidocaine 1 mg/kg
d. Adenosine 6 mg

32. A patient with a possible ST-segment elevation MI has ongoing chest discomfort. Which of the following would be a contraindication for administration of nitrates?

a. HR of 90/min
b. BP > 180 systolic
c. Use of phosphodiesterase inhibitor within 12 hours
d. Left ventricular infarct with bilateral rales
33. A patient has sinus bradycardia with a rate of 36/min. Atropine has been administered to a total dose of 3 mg. TCP has failed to capture. The patient is confused and BP is 100/60. Which of the following is now indicated?

a. give additional 1mg Atropine  
   b. Give NS bolus 250 mL-500mL  
   c. Start dopamine 10-20 ūg/kg per minute  
   d. Start epinephrine 2-10 ūg/min

34. A patient is in pulseless VTach. Two shocks and one dose of epinephrine have been given. The next drug/dose to anticipate to administer is:

a. Vasopressin 40U  
   b. Amiodarone 150 mg  
   c. Lidocaine 0.5 mg/kg  
   d. Epinephrine 3 mg  
   e. Amiodarone 300 mg

35. A patient is in refractory VFib and has received multiple appropriate defibrillations, epinephrine 1 mg IV twice, and an initial dose of lidocaine IV. The patient is intubated. A second dose of lidocaine is now called for. The recommended second dose of lidocaine is:

a. 0.5-0.75 mg/kg IV push  
   b. 2-3 mg/kg IV push  
   c. Give endotracheal dose 2-4 mg/kg  
   d. Start infusion 1-2 mg/min  
   e. 1 mg/kg IV push

36. You arrive on-scene with the Code Team. High-quality CPR is in progress. An AED has previously advised “no shock indicated”. A rhythm now finds asystole. The next action you would take is to:

a. place a Combitube or Laryngeal Mask Airway (LMA)  
   b. Attempt intubation with minimal CPR interruption  
   c. Call for a pulse check  
   d. Place IV or IO access

37. Which of the following is most accurate regarding the administration of vasopressin during cardiac arrest?

a. Vasopressin is indicated for VF and pulseless VT prior to the delivery of the first shock  
   b. Vasopressin can be administered twice during cardiac arrest  
   c. Vasopressin is recommended instead of epinephrine for the treatment of asystole  
   d. The correct dose of Vasopressin is 40 U administered IV or IO

38. A patient is in cardiac arrest. High-quality chest compression are being given. The patient is intubated and an IV has been established. The rhythm is asystole. The first drug/dose to administer is:

a. Atropine 0.5 mg IV or IO  
   b. Epinephrine 3 mg via ETT  
   c. Dopamine 2 to 20 ūg/kg per minute IV or IO  
   d. Atropine 1 mg IV or IO  
   e. Epinephrine 1 mg or Vasopressin 40 U IV or IO
39. A 57 year-old woman has palpitations, chest discomfort and tachycardia. The monitor shows a regular wide-complex QRS at a rate of 180/min. She becomes diaphoretic and BP is 80/60. The next action is to:

   a. Obtain 12 lead ECG
   b. Perform immediate synchronized cardioversion
   c. Establish IV and give sedation for electrical cardioversion
   d. Give amiodarone 300 mg IV push

40. A patient is in refractory VFib. High quality CPR is in progress and shocks have been given. One dose of epinephrine was given after the second shock. An antiarrhythmia drug was given immediately after the third shock. What drug should the team leader request to be prepared for administration?

   a. Repeat the antiarrhythmic
   b. Escalating dose epinephrine 3 mg
   c. Second dose of epinephrine 1 mg
   d. Sodium bicarbonate 50 mEq

41. A bradycardia rhythm IS treated when:

   a. HR is < 60 with or without symptoms
   b. BP < 100 systolic with out without symptoms
   c. The patient has an MI on the 12-lead ECG
   d. CP or shortness of breath is present

Practical Application

42. You arrive on the scene to find CPR in progress. Nursing staff report that the patient was recovering from a pulmonary embolism and suddenly collapsed. There is no pulse or spontaneous respirations. High-quality CPR is in progress and effective ventilation is being provided with bag-mask. An IV has been initiated. You would now:

   a. order immediate endotracheal intubation
   b. give epinephrine 1.0 mg IV
   c. give atropine 1 mg IV
   d. give atropine 0.5 mg IV
   e. initiate transcutaneous pacing
You are monitoring this patient after successful resuscitation. You note the above rhythm on the cardiac monitor and document a rhythm strip for the patient’s chart. She has no complaints and blood pressure is 110/70 mm Hg. Now you would:

a. prepare for transcutaneous pacing (place pacing pads, do not pace yet)
b. give atropine 0.5 mg IV
c. start dopamine 2 to 10 µg/kg per minute and titrate heart rate
d. give atropine 1 mg IV
e. administer sedation and begin immediate transcutaneous pacing at 80 beats/min

Following initiation of CPR and one shock for VF, this rhythm is present on the next rhythm check. A second shock is given and chest compressions are immediately resumed. An IV is in place and no drugs have been given. Bag-mask ventilations are producing visible chest rise. What is your next order?

a. administer 3 sequential (stacked) shocks at 200J (biphasic defibrillator)
b. administer 3 sequential (stacked) shocks at 360J (monophasic defibrillator)
c. prepare to give amiodarone 300 mg IV
d. prepare to give epinephrine 1 mg IV
e. perform endotracheal intubation; administer 100 % oxygen

You are evaluating a patient with a 15-minute duration of chest pain during transportation to the emergency department. He is receiving oxygen, and 2 sublingual nitroglycerin tablets have relieved his chest discomfort. He has no complaints but appears anxious. BP is 130/70 mm Hg. You observe the above rhythm on the monitor and your next action is:

a. start epinephrine 2 to 10 µg/kg per minute and titrate
b. administer nitroglycerine 0.4 mg SL
c. continue monitoring patient, prepare for TCP
d. initiate transcutaneous pacing (TCP)
e. give atropine 0.5 mg IV
You arrive on-scene and find a 56 year-old diabetic woman complaining of chest discomfort. She is pale and diaphoretic, complaining of lightheadedness. Her BP is 80/60 mm Hg. The cardiac monitor documents the rhythm above. She is receiving oxygen at 4 L/min by Nasal Cannula, and an IV has been established. Transcutaneous Pacing has been requested but is not yet available. Your next order is:

a. start dopamine 2 to 10 μg/kg per minute
b. give morphine sulfate 4 mg IV
c. give atropine 1 mg IV
d. give nitroglycerine 0.4 mg SL
e. give atropine 0.5 mg IV

The patient was admitted to the general medical unit with a history of alcoholism. A is in progress and he has recurrent episodes of this rhythm. You review his chart. Notes about the 12-lead ECG say that his baseline QT-interval is top normal to slightly prolonged. He has received 2 doses of epinephrine 1 mg and 1 dose of amiodarone 300 mg IV so far. For his next medication you would now order:

a. give sodium bicarb 50 mEq IV
b. give magnesium sulfate 1 to 2 g IV diluted in 10 mL D5W given over 10 -20 mins.
c. repeat amiodarone 300 mg IV
d. repeat amiodarone 150 mg IV
e. lidocaine 1 to 1.5 mg IV and start infusion 2 mg/minute
A patient becomes unresponsive and you are uncertain if a faint pulse is present with the above rhythm. Your next action is:

- a. consider causes for pulseless electrical activity.
- b. Start an IV and give atropine 1 mg
- c. Start an IV and give epinephrine 1 mg IV
- d. Order transcutaneous pacing
- e. Begin CPR with high-quality chest compressions

You are monitoring a patient. Chest discomfort has been relieved with sublingual nitro and morphine sulfate 4 mg IV. He suddenly has the above persistent rhythm. You ask about symptoms and he reports mild palpitations, but otherwise he is clinically stable with unchanged vital signs. Your next action is:

- a. give immediate synchronized cardioversion
- b. administer amiodarone 150 mg over 10 minutes; seek expert consultation
- c. give sedation and perform synchronized cardioversion
- d. give immediate unsynchronized defibrillation shock
- e. administer magnesium sulfate 1 to 2 g IV diluted in 10 mL D5W over 5-20 minutes
50. A patient with an acute MI on a 12-lead ECG transmitted by the paramedics has the above findings on a rhythm strip when a monitor is placed in the ED. The patient had resolution of moderate (5/10) chest pain with three doses of sublingual nitroglycerine. BP is 104/70 mm Hg. Which intervention below is most important, reducing in-hospital and 30-day mortality?

a. atropine 0.5 mg IV, total dose 2 mg as needed
b. atropine 1 mg IV, total dose 3 mg as needed
c. reperfusion therapy
d. intravenous nitroglycerin for 24 hours
e. Temporary pacing

51. You are the code team leader and arrive finding the above rhythm with CPR in progress. Team members report that the patient was well but complained of chest pain and collapsed. She has no pulse or respirations. Bag-mask ventilations are producing visible chest rise, high-quality CPR is in progress, and an IV has been established. Your next order would be:

a. administer epinephrine 1 mg
b. perform endotracheal intubation
c. administer amiodarone 300 mg
d. administer atropine 1 mg
e. start dopamine at 2 to 10 µg/kg per minute
A 45 year-old woman with a history of palpitations develops lightheadedness and palpitations. She has received adenosine 6 mg IV for the rhythm shown above without conversion of the rhythm. She is now extremely apprehensive. BP is 108/70 mm Hg. The next appropriate intervention is:

a. repeat adenosine 3 mg IV  
b. sedate and synchronized cardiovert  
c. repeat adenosine 12 mg IV  
d. perform vagal maneuvers and repeat adenosine 6 mg IV.  
e. Perform immediate unsynchronized defibrillation

A patient was in refractory VFib. A third shock has just been administered. Your immediate next order is:

a. give atropine 1 mg IV  
b. give amiodarone 300 mg IV  
c. give epinephrine 1 mg IV  
d. resume high-quality chest compressions  
e. perform endotracheal intubation
A 35 year-old woman presents the ED with a chief complaint of palpitations. She has no chest discomfort, shortness of breath, or lightheadedness. Which of the following is indicated first?

- a. give adenosine 3 mg IV fast
- b. give adenosine 12 mg IV slow push (over 1-2 mins)
- c. perform vagal maneuvers
- d. give metoprolol 5 mg IV and repeat if necessary

Following resuscitation with CPR and a single shock, you observe this rhythm while preparing the patient for transport. Your patient is stable and BP is 120/80 mm Hg. She is apprehensive but has no complaints other than palpitations. At this time you would:

- a. give amiodarone 300 mg IV, start infusion
- b. give magnesium sulfate 1-2 g over 20 minutes
- c. give lidocaine 1-1.5 mg IV, start lidocaine infusion
- d. seek expert consultation
You are monitoring a patient with chest discomfort who becomes suddenly unresponsive. You observe the above rhythm on the cardiac monitor. A monophasic defibrillator is present. What is your first action:

a. give a single shock with 200 J  
b. give a single shock with 360 J  
c. intubate the patient and give epinephrine 2-4 mg via ET tube.  
d. Begin CPR with chest compressions for 2 mins or about 5 cycles.  
e. Establish an IV and give epinephrine 1 mg IV

This patient suddenly collapsed and is poorly responsive. The patient has a weak carotid pulse. A cardiac monitor, oxygen, and an IV line have been initiated. The code cart with all drugs and TCP is immediately available. Next you would:

a. begin TCP  
b. initiate dopamine 2 to 10 μg/kg per minute and titrate heart rate  
c. initiate dopamine 10 to 20 μg/kg per minute and titrate heart rate  
d. initiate epinephrine 2 to 10 μg per minute and titrate heart rate  
e. give atropine 1 mg IV up to a total dose of 3 mg.
58. This patient has been resuscitated from cardiac arrest. During the resuscitation amiodarone 300 mg was administered. Now the patient develops severe chest discomfort, is diaphoretic, and has the above rhythm. BP is 80/60 mm Hg. What is the next indicated action:

a. repeat amiodarone 300 mg IV.
b. Perform synchronized cardioversion
c. Give immediate unsynchronized defibrillation
d. Give lidocaine 1-1.5 mg/kg IV
e. Repeat amiodarone 150 mg IV

59. A patient has been resuscitated from cardiac arrest and is being prepared for transport. She is intubated and is receiving 100% oxygen. During the resuscitation she received 2 doses of epinephrine 1 mg, atropine 1 mg, and lidocaine 100 mg IV. You now observe the above rhythm on the cardiac monitor. The rhythm abnormally is becoming more frequent and increasing in number. You should order:

a. give amiodarone 150 mg IV, start infusion
b. give amiodarone 300 mg IV, start infusion
c. give lidocaine 1-1.5 mg IV
d. repeat epinephrine 1 mg IV
e. give lidocaine 0.5-0.75 mg/kg IV, start lidocaine infusion
A patient in the ED develops recurrent chest discomfort (8/10) suspicious for ischemia. His monitored rhythm becomes irregular as seen above. Oxygen is being administered by NC at 4 L/min and an IV line is patent. BP is 160/96. There are no allergies or contraindications to any meds. You would first order:

a. lidocaine 1 mg/kg and infusion 2 mg/min
b. IV nitroglycerine initiated at 10 μg/min and titrated
c. Morphine sulfate 2-4 mg IV
d. Amiodarone 150 mg IV
e. Nitroglycerin 0.4 mg SL

A patient presents with the above rhythm complaining of an irregular heart beat. She has no other complaints. Past medical history is significant for an MI 7 years ago. BP is 110/70. At this time you would:

a. perform elective synchronized cardioversion with presedation
b. administer lidocaine 1 mg/kg IV
c. administer nitroglycerine 0.4 mg sublingual or spray
d. continue monitoring and seek expert consultation
e. perform emergency synchronized cardioversion
ECG Analysis

1. ____________________________
2. ____________________________
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7. ____________________________
8. ____________________________
9. ____________________________
10. ____________________________

Pharmacology

21. a. b. c. d.
22. a. b. c. d.
23. a. b. c. d.
24. a. b. c. d.
25. a. b. c. d.
26. a. b. c. d.
27. a. b. c. d.
28. a. b. c. d.
29. a. b. c. d.
30. a. b. c. d.
31. a. b. c. d.
32. a. b. c. d.
33. a. b. c. d.
34. a. b. c. d. e.
35. a. b. c. d. e.
36. a. b. c. d.
37. a. b. c. d.
38. a. b. c. d. e.
39. a. b. c. d.
40. a. b. c. d.
41. a. b. c. d.

Practical Application

42. a. b. c. d. e.
43. a. b. c. d. e.
44. a. b. c. d. e.
45. a. b. c. d. e.
46. a. b. c. d. e.
47. a. b. c. d. e.
48. a. b. c. d. e.
49. a. b. c. d. e.
50. a. b. c. d. e.
51. a. b. c. d. e.
52. a. b. c. d. e.
53. a. b. c. d. e.
54. a. b. c. d.
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56. a. b. c. d. e.
57. a. b. c. d. e.
58. a. b. c. d. e.
59. a. b. c. d. e.
60. a. b. c. d. e.
61. a. b. c. d. e.
ECG Analysis

1. Supraventricular Tachycardia (SVT)
2. Fine Ventricular Fibrillation
3. 2nd degree Type II Block
4. NSR
5. SVT
6. Asystole
7. Polymorphic VTach
8. SVT
9. Sinus Brady
10. 2nd degree Type II Block

Pharmacology

21. a. b. c. d.
22. a. b. c. d.
23. a. b. c. d.
24. a. b. c. d.
25. a. b. c. d.
26. a. b. c. d.
27. a. b. c. d.
28. a. b. c. d.
29. a. b. c. d.
30. a. b. c. d.
31. a. b. c. d.
32. a. b. c. d.
33. a. b. c. d.
34. a. b. c. d. e.
35. a. b. c. d. e.
36. a. b. c. d.
37. a. b. c. d.
38. a. b. c. d. e.
39. a. b. c. d.
40. a. b. c. d.
41. a. b. c. d.

Practical Application

42. a. b. c. d. e.
43. b. c. d. e.
44. a. b. c. d. e.
45. a. b. c. d. e.
46. a. b. c. d. e.
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61. a. b. c. d. e.