

Cardiology #1 – The Cardiac Cycle: Mechanisms of Heart Sounds & Murmurs

- 1) Which of the following occurs first at the onset of isovolumic contraction?
- Atrial kick
 - Cessation of ventricular filling
 - Mitral valve opens
 - Mitral valve closes
 - Aortic valve opens
- 2.1) Which of the following would accentuate the v-wave of the jugular venous waveform?
- Right ventricular hypertrophy
 - Constrictive pericarditis
 - Cardiac tamponade
 - Tricuspid stenosis
 - Tricuspid regurgitation
- 2.2) The c-wave of the jugular venous waveform is seen as a rise in right atrial pressure as what event occurs?
- Right atrial contraction
 - Tricuspid valve bulging toward atrium
 - Tricuspid valve pulled toward ventricle
 - Ventricular systole
 - Ventricular passive filling
- 2.3) The a-wave of the jugular venous waveform is seen as a rise in right atrial pressure as what event occurs?
- Right atrial contraction
 - Tricuspid valve bulging toward atrium
 - Tricuspid valve pulled toward ventricle
 - Ventricular systole
 - Ventricular passive filling

Match the heart sound with the physiological event that is responsible for the sound:

- 3.1) S1 a) Chordea tendineae tensing
- 3.2) S2 b) Ventricular vibration as AV valves close
- 4.1) S3 c) Atrial kick against non-compliant ventricle
- 4.2) S4 d) Ventricular vibration as outflow valves close
- 5.1) Sudden limitation of longitudinal ventricular expansion during early rapid ventricular filling is associated with which heart sound?
- S1
 - S2
 - S3
 - S4
- 5.2) What heart sound is of low frequency and has a similar tone to the syllables in “Kentucky”?
- S1
 - S2
 - S3
 - S4

6.1) While auscultating over the third intercostal space at the left sternal border (3LSB), splitting of S2 is heard during expiration, with the aortic valve (A2) coming before the pulmonic valve (P2). What is the likely cause?

- a) Physiologic
- b) Aortic stenosis (AS)
- c) Left bundle branch block (LBBB)
- d) Hypertrophic obstructive cardiomyopathy (HOCM)
- e) Electronic right ventricular pacemaker

6.2) An atrial septal defect (ASD) would likely cause which of the following when auscultating at 3LSB?

- a) Splitting of S2 during inspiration
- b) Splitting of S2 during expiration
- c) Fixed splitting of S2 during inspiration and expiration
- d) Mid-systolic murmur with no splitting of S2
- e) Random splitting of S2 dependent on heart rate

7.1) What is the lowest grading of systolic murmur (Freeman-Levine system) that is associated with a palpable thrill?

- a) 2
- b) 3
- c) 4
- d) 5
- e) 6

7.2) Aside from the pulmonic ejection sound, which of the following is true of pathological auscultatory findings during inspiration?

- a) Left-sided findings decrease in intensity
- b) Left-sided findings increase in intensity
- c) Right-sided findings decrease in intensity
- d) Right-sided findings increase in intensity

7.3) Which of the following would increase venous return and thus increase ventricular preload?

- a) Passive declination (de-elevation) of the legs
- b) Going from a squatting to standing position
- c) Placing a cold pack on the face
- d) Valsalva maneuver
- e) Muller maneuver

7.4) Which of the following would be used to decrease systemic arterial pressure?

- a) Sustained handgrip
- b) Amyl nitrite
- c) Methoxamine
- d) Phenylephrine
- e) Premature ventricular contractions

8.1) A patient presents with a systolic murmur that does not change with inspiration. Which of the following is most likely?

- a) Aortic stenosis
- b) Pulmonic stenosis
- c) Pulmonic regurgitation

- d) Mitral stenosis
 - e) Tricuspid regurgitation
- 8.2) An elderly patient presents with a diastolic murmur that gets louder during inspiration. Which of the following are the most likely?
- a) Aortic regurgitation or mitral stenosis
 - b) Aortic stenosis or mitral regurgitation
 - c) Pulmonic regurgitation or tricuspid stenosis
 - d) Pulmonic stenosis or tricuspid regurgitation
- 8.3) Which of the following would help differentiate aortic stenosis (AS) from other types of murmurs?
- a) Heard during systole and louder with inspiration
 - b) Heard during diastole and louder with inspiration
 - c) Heard during systole and does not change with inspiration
 - d) Heard during diastole and does not change with inspiration
- 8.4) Which of the following systolic murmur causes would lead to a holosystolic (pansystolic) murmur, versus a systolic ejection murmur (SEM)?
- a) Hypertrophic obstructive cardiomyopathy (HOCM)
 - b) Aortic stenosis (AS)
 - c) Pulmonic stenosis (PS)
 - d) Tricuspid regurgitation (TR)
 - e) Innocent murmurs
- 8.5) Which of the following types of murmurs would likely be heard with acute mitral regurgitation (MR)?
- a) Holosystolic
 - b) Early systolic crescendo-decrescendo
 - c) Late systolic crescendo-decrescendo
 - d) Early diastolic crescendo-decrescendo
 - e) Late diastolic crescendo-decrescendo
- 8.6) Which of the following would occur for a patient with mitral valve prolapse (MVP) who goes from supine into the squatting position during auscultation?
- a) The click will remain mid-systolic
 - b) The click will occur earlier
 - c) The click will occur later
 - d) The click will overlap with S1
 - e) The click will overlap with S2
- 8.7) Tricuspid regurgitation murmurs follow the Carvallo sign, meaning they are:
- a) Holosystolic and get louder with inspiration
 - b) Holosystolic and do not change with inspiration
 - c) Mid-systolic and get louder with inspiration
 - d) Mid-systolic and do not change with inspiration
 - e) Continuous through systole and diastole
- 8.8) A patient presents with a holosystolic murmur that is best heard at the lower left sternal border. The murmur is harsh and gets louder with inspiration. Which of the following is the most likely?
- a) Mitral regurgitation (MR)
 - b) Tricuspid regurgitation (TR)

- c) Aortic stenosis (AS)
 - d) Pulmonic stenosis (PS)
 - e) Ventricular septal defect (VSD)
- 9.1) A patient presents with an early systolic ejection click heard at 2RSB. Carotid bruits are heard, which get louder as they move toward the heart. After an induced PVC, the next beat is a louder murmur. The murmur gets softer with Valsalva maneuver and louder with squatting. Which of the following is most likely?
- a) Aortic stenosis (AS)
 - b) Aortic insufficiency (AI)
 - c) Mitral stenosis (MS)
 - d) Mitral regurgitation (MR)
 - e) Mitral valve prolapse (MVP)
- 9.2) The most common congenital cardiac anomaly is a bicuspid aortic valve. What is the most common congenital cardiac anomaly that is diagnosed at childhood?
- a) Atrial septal defect (ASD)
 - b) Ventricular septal defect (VSD)
 - c) Tetralogy of Fallot (TOF)
 - d) Hypoplastic left heart syndrome (HLHS)
 - e) Ebstein anomaly
- 9.3) A patient presents with a systolic ejection murmur that is crescendo-decrescendo. The murmur gets louder with Valsalva maneuver and softer with squatting and isometric handgrip. The murmur does not change with inhalation or exhalation. Which of the following is most likely?
- a) Aortic stenosis (AS)
 - b) Mitral valve prolapse (MVP)
 - c) Mitral stenosis (MS)
 - d) Ventricular septal defect (VSD)
 - e) Hypertrophic cardiomyopathy (HCM)
- 9.4) A patient presents with an early diastolic blowing decrescendo murmur. The murmur is best heard at 3LSB with deep exhalation using the stethoscope diaphragm. The murmur does not change with inhalation or exhalation. Using the stethoscope bell at the apex, a diastolic rumble (Austin Flint murmur) is heard. Which of the following is most likely?
- a) Pulmonic insufficiency (PI)
 - b) Aortic insufficiency (AI)
 - c) Mitral regurgitation (MR)
 - d) Tricuspid regurgitation (TR)
 - e) Hypertrophic cardiomyopathy (HCM)
- 9.5) A systolic murmur is heard over the femoral artery when the stethoscope is compressed proximally, and a diastolic murmur is heard when the stethoscope is compressed distally. This is the most predictive sign of aortic insufficiency and is called:
- a) Quincke pulse
 - b) Hill sign
 - c) Duroziez sign
 - d) Corrigan pulse
 - e) Traube sign
 - f) Mueller sign

9.6) When listening at 3LSB, an early diastolic decrescendo murmur is heard. The murmur is high-pitched and blowing in quality. The murmur gets louder with inspiration and an S2 split is heard with the first component being the loudest. This Graham Steell murmur is most likely associated with:

- a) Pulmonic insufficiency (PI)
- b) Aortic insufficiency (AI)
- c) Mitral regurgitation (MR)
- d) Tricuspid regurgitation (TR)
- e) Hypertrophic cardiomyopathy (HCM)

9.7) A 12-year-old presents with a high fever. History reveals the child was seen two weeks earlier for a strep throat infection and given antibiotics for Group A streptococcus. However, the guardian never filled the prescription. A Carey-Combs murmur is heard as a low-pitched mid-diastolic rumble at the apex. An opening snap is heard after S2. Which of the following is most likely?

- a) Aortic insufficiency (AI)
- b) Pulmonic insufficiency (PI)
- c) Tricuspid stenosis (TS)
- d) Mitral stenosis (MS)
- e) Hypertrophic cardiomyopathy (HCM)

9.8) A 21-year-old female presents with complaints of breathing difficulty. History reveals she is taking an over-the-counter anorectic diet medication (appetite suppressant). Cardiac exam reveals a murmur at the lower LSB that get louder with inspiration. The murmur is mid-diastolic and low-pitched. Which of the following is most likely?

- a) Aortic insufficiency (AI)
- b) Pulmonic insufficiency (PI)
- c) Tricuspid stenosis (TS)
- d) Mitral stenosis (MS)
- e) Hypertrophic cardiomyopathy (HCM)

9.9) Which of the following would NOT cause a continuous murmur?

- a) Patent ductus arteriosus (PDA)
- b) Atrial septal defect (ASD)
- c) Ventricular septal defect (VSD)
- d) Mitral valve prolapse (MVP)
- e) Ruptured aneurysm of sinus of Valsalva

9.10) A patient presents with a pericardial friction rub. The rub is tri-phasic and evanescent. Jugular venous pressure increases during inspiration (Kussmaul sign). Which of the following is most likely?

- a) Pericardial tamponade
- b) Acute pericarditis
- c) Pulmonary embolism
- d) Ventricular infarction
- e) Venous thrombosis

9.11) A patient presents with hypotension, jugular venous distention, and distant heart sounds (Beck triad). During inspiration, exaggerated pulsus paradoxus is seen. Which of the following is most likely?

- a) Pericardial tamponade

- b) Acute pericarditis
 - c) Pulmonary embolism
 - d) Ventricular infarction
 - e) Venous thrombosis
- 9.12) Patients with Virchow triad are at high risk for which of the following
- a) Pericardial tamponade
 - b) Acute pericarditis
 - c) Pulmonary embolism
 - d) Ventricular infarction
 - e) Venous thrombosis

Cardiology #2 – Principles of Electrophysiology

- 1) The heart is in diastole during which phase of the cardiac action potential?
- a) Phase 0
 - b) Phase 1
 - c) Phase 2
 - d) Phase 3
 - e) Phase 4
- 2.1) Which of the following is NOT a tract electrically connecting the right atrium to the left atrium?
- a) Bachmann bundle
 - b) Superior
 - c) Anterior
 - d) Posterior
 - e) Middle
- 2.2) The rapid activation of myocardial cells is due in part to the strong presence of which gap junction connexin protein?
- a) Cx 26
 - b) Cx 30
 - c) Cx 32
 - d) Cx 43
 - e) Cx 47
- 3.1) Which of the following is notably found in Brugada syndrome?
- a) Early after-depolarization
 - b) Later after-depolarization
 - c) Circus movement re-entry
 - d) Reflection re-entry
 - e) Phase 2 re-entry
- 3.2) Which of the following occurs during phase 2 and 3 of the cardiac action potential and is associated with long QT syndrome?
- a) Early after-depolarization
 - b) Later after-depolarization
 - c) Circus movement re-entry
 - d) Reflection re-entry
 - e) Phase 2 re-entry

3.3) During which phase of the cardiac action potential do late after-depolarizations arise?

- a) Phase 0
- b) Phase 1
- c) Phase 2
- d) Phase 3
- e) Phase 4

3.4) A patient with a known unidirectional ventricular accessory pathway is implanted with an implantable cardioverter defibrillator (ICD). During a ventricular tachycardia episode, the device will determine the ventricular rate and then pace several times at a higher rate in order to painlessly terminate the episode. What type of cardiac arrhythmia mechanism is this device treating?

- a) Early after-depolarization
- b) Later after-depolarization
- c) Circus movement re-entry
- d) Reflection re-entry
- e) Phase 2 re-entry

Cardiology #3 – Electrophysiologic Diagnostic Studies

1) Which of the following would NOT be a useful diagnostic tool for a patient presenting with palpitations?

- a) History and physical exam
- b) External event monitor (Holter)
- c) Electrophysiology study
- d) Exercise stress test
- e) Tilt table test

2) Which of the following would NOT be a useful diagnostic tool for a patient presenting with dizziness?

- a) History and physical exam
- b) Implanted event monitor (loop recorder)
- c) ENT or neurologic consult
- d) Tilt table test
- e) Electrophysiology study

3.1) Which of the following would NOT be a useful diagnostic tool for a patient presenting with syncope?

- a) Signal averaged ECG (SAECG)
- b) External or implanted event monitor
- c) Electrophysiology study
- d) Cryoablation or laser catheter ablation
- e) Microvolt T wave alternans (MTWA)

3.2) For patients presenting with palpitations, dizziness, or syncope, what is the recommended diagnostic test after a history and physical exam have been performed?

- a) External or implanted event monitor
- b) Tilt table test
- c) ENT, neurologic, or psychiatric consult
- d) Exercise stress test

- e) Glucose tolerance test
- 4) An event monitor would be indicated instead of a Holter monitor for which of the following cases?
 - a) Elderly patient with suspected atrial fibrillation found during pulse palpation
 - b) To determine ST segment changes after an acute myocardial infarction (MI)
 - c) Medical student with intermittent caffeine-induced supraventricular tachycardia
 - d) To identify and quantify an asymptomatic bradyarrhythmia or tachyarrhythmia
 - e) Patient presenting with short PR due to Lown-Ganong-Levine (LGL) syndrome

Cardiology #4 – Cardiac Arrhythmias with Supraventricular Origin

- 1) Which of the following describes non-sustained tachyarrhythmia?
 - a) Arrhythmia with rate >60 for 3 beats or more for less than 1 minute
 - b) Arrhythmia with rate >150 for 3 beats or more for less than 30 seconds
 - c) Arrhythmia with rate >150 for 6 beats or more for less than 1 minute
 - d) Arrhythmia with rate >100 for 3 beats or more for less than 30 seconds
 - e) Arrhythmia with rate >100 for 6 beats or more for less than 30 seconds
- 2) A supraventricular arrhythmia is any arrhythmia that arises above what level?
 - a) Purkinje fibers
 - b) Either left or right bundle branch
 - c) Atrioventricular bundle (of His)
 - d) Atrioventricular (AV) node
 - e) Sinoatrial (SA) node
- 3) Patients who are diagnosed with Wolff-Parkinson-White (WPW) syndrome have an ECG with a short PR interval, delta wave, and a history of which of the following?
 - a) Atrial fibrillation (Afib)
 - b) Paroxysmal supraventricular tachycardia (PSVT)
 - c) Orthodromic circus movement tachycardia (CMT)
 - d) Antidromic circus movement tachycardia (CMT)
 - e) Any of the above
 - f) All of the above
- 4) What is the preferred treatment of symptomatic sustained regular re-entrant supraventricular tachycardia?
 - a) Digitalis
 - b) Amiodarone
 - c) Beta-blocker
 - d) Calcium-channel blocker
 - e) Radiofrequency ablation
- 5) All patients over the age of 65 who have atrial fibrillation are indicated for long-term therapy with which of the following?
 - a) Warfarin
 - b) Amiodarone
 - c) Beta-blocker
 - d) Calcium-channel blocker
 - e) Class I (procainamide) or III (amiodarone) antiarrhythmic
- 6) Which of the following patients would receive an electronic pacemaker to treat their symptomatic bradycardia?

- a) Sinus node dysfunction (sick sinus syndrome)
 - b) Third degree block
 - c) Second degree block type II
 - d) Neuromuscular disease with AV block
 - e) All of the above
- 7) Which of the following types of atrioventricular blocks would present with a wide QRS complex?
- a) First degree block at the AV nodal level
 - b) Second degree block type I at the AV nodal level
 - c) Second degree block type II at the His bundle level
 - d) Third degree block at the His bundle level
 - e) Third degree block at the infra-His level
- 8) A patient presents with disease of the His-purkinje system (HPS). Their ECG shows a lengthened PR interval that does not change and loss of QRS complexes at regular intervals. Which of the following is most likely?
- a) First degree block at the AV nodal level
 - b) Second degree block type I at the AV nodal level
 - c) Second degree block type II at the His bundle level
 - d) Third degree block at the His bundle level
 - e) Third degree block at the infra-His level

Cardiology #5 – Ventricular Arrhythmias & Sudden Cardiac Death

- 1) Which of the following should NOT be given to a patient with premature ventricular contractions (PVCs)?
- a) Amiodarone (Cordarone, Class III)
 - b) Lidocaine (Dilocaine, Class Ib)
 - c) Procainamide (Procanbid, Class Ia)
 - d) Metoprolol (Lopressor, beta-blocker)
 - e) Digoxin (Lanoxin, cardiac glycoside)
- 2) An unconscious patient is brought to the Emergency Room by ambulance. They show signs of hypotension with cyanosis and cool extremities. Physical exam reveals jugular venous distention with cannon A waves, pulmonary rales on auscultation, and a variable intensity S1. Which of the following is most likely?
- a) Atrial fibrillation
 - b) Supraventricular tachycardia
 - c) Ventricular tachycardia
 - d) Third degree AV block
 - e) Ventricular asystole
- 3) Which of the following patients would most likely develop sustained monomorphic ventricular tachycardia?
- a) Patients with prior inferior MIs
 - b) Patients with prior lateral MIs
 - c) Patients with pericarditis
 - d) Patients with chronic obstructive pulmonary disease (COPD)
 - e) Patients with WPW syndrome who are taking amiodarone

- 4) The polymorphic ventricular tachycardia Torsade de Pointed (TdP), or “twisting of the points,” is associated with all of the following EXCEPT?
- a) Class Ia antiarrhythmics
 - b) Class III antiarrhythmics
 - c) Hypokalemia
 - d) Magnesium supplements
 - e) Long QT syndrome
- 5) What is the strongest independent predictor of sudden cardiac death in patients who have previously suffered a myocardial infarction (indication for an ICD)?
- a) Left ventricular dysfunction with ejection fraction < 30%
 - b) Right ventricular dysfunction with ejection fraction < 30%
 - c) Aortic stenosis with blood pressure > 140mmHg systolic
 - d) Pulmonary hypertension with blood pressure > 140mmHg systolic
 - e) Ventricular dyssynchrony with heart rate > 100 beats per minute
- 6) Along with angiotensin converting enzyme (ACE) inhibitors, what type of medications have been proven to reduce the risk of sudden cardiac death as well as total mortality (25% reduction) in survivors of myocardial infarction?
- a) NSAIDs
 - b) Class Ia antiarrhythmics
 - c) Class III antiarrhythmics
 - d) Beta-blockers
 - e) Calcium-channel blockers
- 7) Which of the following causes of sudden cardiac death in patients without structural cardiac pathology accounts for 90% of long QT syndrome cases?
- a) Romano-Ward syndrome
 - b) Wolff-Parkinson-White syndrome
 - c) Lown-Ganong-Levine syndrome
 - d) Brugada syndrome
 - e) Jervell-Lange-Nielsen syndrome

Cardiology #6 – Electrophysiologic Interventional Procedures & Surgery

- 1) Which of the following is NOT a common correctable cause for symptomatic bradycardia which should be excluded prior to the implantation of a permanent cardiac pacemaker?
- a) Hypothyroidism
 - b) Beta-adrenergic blocker use
 - c) Calcium-channel blocker use
 - d) Alternating bundle branch block
 - e) Digitalis overdose or antiarrhythmic drug use
- 2) Which of the following is NOT true regarding the use of electrical cardioversion?
- a) Requires defibrillator pads and ECG monitoring leads for synchronization
 - b) For patients with atrial fibrillation, 3 weeks of anticoagulation is needed
 - c) Should be avoided in digitalis toxicity due to post shock arrhythmias
 - d) Is an elective treatment option for supraventricular tachycardia (SVT)
 - e) Is the treatment of choice for ventricular fibrillation (VF) and pulseless ventricular tachycardia (VT)

3) Which of the following patients is NOT indicated for an implantable cardioverter-defibrillator (ICD)?

- a) Patients who have survived an episode of VF
- b) Patients with spontaneous episodes of nonsustained VT
- c) Patients with inducible VT during EP study
- d) Patients with ejection fraction <30% and risk of cardiac arrest
- e) Patients with incessant VT or VF

Cardiology #7 – Antiarrhythmic Drugs

1.1) Which of the classes of Vaughan-Williams antiarrhythmic drugs prolong the QT interval and thus could lead to Torsade de Pointes?

- a) Ia, Ib, Ic, and III
- b) II and IV
- c) Ia and III
- d) Ia, Ib, and IV
- e) Ib, II, and IV

1.2) Which of the following would be contraindicated in atrioventricular nodal block as it increases the PR and QRS interval?

- a) Ia
- b) Ib
- c) Ic
- d) III
- e) IV

Match the drug with the Vaughan-Williams classification:

- | | |
|-------------------------------|----------|
| 2.1) Amiodarone (Cordarone) | a) Ia |
| 2.2) Diltiazem (Cardiazem) | b) Ib |
| 2.3) Mexiletine (Mexitil) | c) Ic |
| 2.4) Adenosine (Adenocard) | d) II |
| 2.5) Esmolol (Brevibloc) | e) III |
| 2.6) Quinidine & Procainamide | f) IV |
| 2.7) Bretylium (Bretylol) | g) Other |
| 2.8) Lidocaine (Xylocaine) | |
| 2.9) Disopyramide (Norpace) | |
| 2.10) Propafenone (Rhythmol) | |

3) Which of the following is NOT a mechanism of action for the antiarrhythmic drugs?

- a) Sodium channel blockade
- b) Calcium channel blockade
- c) Prolongation of the effective refractory period
- d) Blockade of sympathetic autonomic effects in the heart
- e) Blockade of parasympathetic autonomic effects in the SA and AV node

4) Most antiarrhythmic drugs work by stabilizing membrane potential near potassium equilibrium potential via a reduction in the slope of which phase of the cardiac action potential, leading to reduced abnormal automaticity?

- a) Phase 0
- b) Phase 1
- c) Phase 2

- d) Phase 3
 - e) Phase 4
- 5) Most antiarrhythmic agents slow conduction of re-entry arrhythmias by reducing the number of available unblocked channels or by:
- a) Prolonging channel recovery time
 - b) Reducing relative refractory time
 - c) Reducing absolute refractory time
 - d) Propagating early extrasystoles
 - e) Increasing the number of unidirectional conduction blocks
- 6) The major effect of quinidine on the cardiac action potential is to slow:
- a) Phase 0
 - b) Phase 1
 - c) Phase 2
 - d) Phase 3
 - e) Phase 4
- 7) A patient being treated for an atrial arrhythmia develops headache, tinnitus, flushed skin, and dizziness. Prior to this episode the patient was warned they would have diarrhea. Which of the following drugs was the patient most likely taking?
- a) Bretylium
 - b) Metoprolol
 - c) Lidocaine
 - d) Quinidine
 - e) Phenytoin
- 8) Which of the following patients is most likely to receive quinidine for their arrhythmia?
- a) Patient with atrial fibrillation, Ashman phenomenon, and HOCM
 - b) Patient with recurrent episodes of ventricular fibrillation
 - c) Patient with atrial fibrillation and a structurally normal heart
 - d) Patient with atrial flutter and congenital long QT syndrome
 - e) Patient with known allergy to antimalarial medications
- 9) Which of the following is true of procainamide when compared to quinidine?
- a) It should only be used for supraventricular arrhythmias
 - b) It is more effective at suppressing abnormal ectopic beats
 - c) It has less prominent antimuscarinic effects
 - d) It is less effective in blocking sodium channels in depolarized cells
 - e) It does not directly depress the SA and AV nodes
- 10) Which of the following is the most common extracardiac affect seen with long-term use of procainamide?
- a) Pleuritis with pericarditis
 - b) Lupus-like syndrome
 - c) Nausea and diarrhea
 - d) Hepatitis
 - e) Agranulocytosis
- 11) A patient with renal disease is receiving treatment for a ventricular arrhythmia with procainamide. Which of the following could occur with accumulation of the metabolite N-acetylprocainamide (NAPA)?

- a) Thrombocytopenia
 - b) Megaloblastic anemia
 - c) Total peripheral neuropathy
 - d) Torsade de Pointes
 - e) Coronary vessel spasm
- 12) Which of the following describes a therapeutic use of procainamide?
- a) For rapid atrial fibrillation with or without Ashman phenomenon
 - b) For supraventricular tachycardia after Valsalva maneuvers
 - c) For second degree type II AV block or third degree AV block
 - d) For Torsade de Pointes due to prolongation of the QT interval
 - e) For sustained ventricular tachycardia associated with acute MI
- 13) Which of the following is the correct order from strongest to weakest for cardiac antimuscarinic effects?
- a) Disopyramide > Procainamide > Quinidine
 - b) Disopyramide > Quinidine > Procainamide
 - c) Quinidine > Procainamide > Disopyramide
 - d) Quinidine > Disopyramide > Procainamide
 - e) Procainamide > Disopyramide > Quinidine
- 14) Disopyramide should be avoided for which of the following patients?
- a) Patient with well controlled glaucoma
 - b) Patient with diabetes mellitus type 2
 - c) Patient with left ventricular (LV) heart failure
 - d) Patient with arrhythmias due to an inferoposterior infarct
 - e) Patient with LV ejection fraction (LVEF) > 55%
- 15) Disopyramide (Norpace) is approved for which of the following in the United States?
- a) Atrial arrhythmias
 - b) Ventricular arrhythmias
 - c) Atrial and ventricular arrhythmias
 - d) Bradyarrhythmias of supraventricular origin
 - e) For improving pacing and defibrillation thresholds
- 16) Which of the following describes the cardiac effects of lidocaine?
- a) Blocks activated sodium channels with rapid kinetics
 - b) Blocks inactivated sodium channels with rapid kinetics
 - c) Blocks activated and inactivated sodium channels with rapid kinetics
 - d) Blocks inactivated sodium channels with slow kinetics
 - e) Blocks activated and inactivated sodium channels with slow kinetics
- 17) Which of the following patients may experience hypotension when receiving a large dose of lidocaine?
- a) Patient with poorly controlled diabetes
 - b) Patient with hypertension of 180mmHg systolic
 - c) Patient with left ventricular (LV) heart failure
 - d) Patient with arrhythmias due to an inferoposterior infarct
 - e) Patient with LV ejection fraction (LVEF) of 65%
- 18) Which of the following is NOT a route of administration for lidocaine when used to treat cardiac arrhythmias?
- a) Endotracheal (ET)

- b) Intravenous (IV)
 - c) Intramuscular (IM)
 - d) Oral pill or spray (PO)
 - e) Intraosseous (IO)
- 19) Which of the following patients would NOT require extra precautions when administering lidocaine?
- a) Patient with left ventricular (LV) heart failure
 - b) Patient taking propranolol (Inderal)
 - c) Patient taking cimetidine (Tagamet)
 - d) Patient with cirrhosis of the liver
 - e) Patient taking NSAIDs
- 20) A patient presents in pulseless cardiac arrest (VT/VF). Two defibrillation attempts are made and a round of a vasopressor (epinephrine) is given via IV. As cardiopulmonary resuscitation (CPR) continues, what drug could be given to help terminate the arrhythmia?
- a) Adenosine (Adenocard)
 - b) Diltiazem (Cardiazem)
 - c) Flecainide (Tambocor)
 - d) Lidocaine (Xylocaine)
 - e) Esmolol (Brevibloc)
- 21) Flecainide and propafenone are effective in suppressing supraventricular arrhythmias. Flecainide is also useful for suppressing which of the following?
- a) Premature ventricular contractions (PVCs)
 - b) Ventricular fibrillation (VF)
 - c) Torsade de Pointes (TdP)
 - d) Ventricular tachycardia (VT)
 - e) Ventricular asystole
- 22) Which of the following is a life-threatening adverse effect of flecainide and propafenone?
- a) Metallic taste and constipation
 - b) Exacerbation of arrhythmia
 - c) Severe hyperkalemia
 - d) Hemolytic anemia
 - e) Watershed infarct
- 23) What was the result of the cardiac arrhythmia suppression trial (CAST), where flecainide and encainide were used to suppress post-MI PVCs?
- a) Flecainide showed better total survival over encainide
 - b) Encainide showed better total survival over flecainide
 - c) Flecainide was not able to suppress post-MI PVCs
 - d) Encainide was not able to suppress post-MI PVCs
 - e) Both drugs led to increased mortality
- 24) What is the major cardiac effect of beta-blocking agents?
- a) Increased vascular resistance
 - b) Decreased right atrial preload
 - c) Increased left ventricular function
 - d) Decreased heart rate

- e) Increased left ventricular ejection fraction
- 25) Class III antiarrhythmics prolong the cardiac action potential and increase the QT interval via what mechanism?
- a) Sodium channel blockade
 - b) Calcium channel blockade
 - c) Potassium channel blockage
 - d) Blockade of parasympathetic cholinergic effects in the heart
 - e) Blockade of sympathetic autonomic effects in the heart
- 26) Which of the following is an indication for the use of amiodarone in the United States?
- a) Ventricular tachycardia (ARREST trial)
 - b) Ventricular fibrillation (ARREST trial)
 - c) Atrial fibrillation (ARCH trial)
 - d) A & B
 - e) All of the above
- 27) Which of the following is NOT a cardiac effect of amiodarone?
- a) Markedly prolongs the action potential
 - b) Increases AV nodal conduction
 - c) Blocks delayed rectifier potassium current
 - d) Blocks inactivated sodium channels
 - e) Has weak adrenergic and calcium-channel blocking capacities
- 28) Which of the following is NOT an extracardiac toxicity or side-effect associated with amiodarone?
- a) Iodine-blocking induction of hypothyroidism or hyperthyroidism
 - b) Gray-blue photodermatitis and corneal microdeposits
 - c) Dose-related pulmonary toxicity
 - d) Abnormal liver function tests and hepatitis
 - e) Drug-induced supraventricular tachycardia and atrial fibrillation
- 29) Which of the following patients should NOT be given amiodarone?
- a) Patient with ventricular tachycardia
 - b) Patient with ventricular fibrillation
 - c) Patient with second degree AV block type II
 - d) Patient with atrial fibrillation
 - e) Patient in cardiac arrest with a shockable rhythm
- 30) Levels of amiodarone would decrease with administration of which of the following drugs?
- a) Cimetidine (Tagamet)
 - b) Rifampin (Rifadin)
 - c) Digoxin (Lanoxin)
 - d) Warfarin (Coumadin)
- 31) Amiodarone is effective but currently NOT indicated as a therapeutic use for which of the following arrhythmias?
- a) Ventricular tachycardia
 - b) Ventricular fibrillation
 - c) Torsade de Pointes
 - d) Atrial fibrillation

- e) Premature atrial contractions
- 32) Why should a tricyclic antidepressant (TCA) such as protriptyline be given concomitantly when giving bretylium tosylate?
- a) To prevent the catecholamine blockade
 - b) To block the initial release of catecholamines when first given
 - c) To help prevent postural hypertension due to blocked baroreceptor reflex
 - d) To help prevent nausea and vomiting after the first bolus
 - e) To further lengthen the ventricular action potential
- 33) What is the therapeutic use of bretylium?
- a) For ventricular arrhythmias as a first-line therapy
 - b) For ventricular arrhythmias as a last resort
 - c) For atrial arrhythmias as a first-line therapy
 - d) For atrial arrhythmias as a last resort
 - e) For patients with ejection fraction < 30%
- 34) Which of the following is NOT true regarding racemic sotalol (Betapace)?
- a) The d-isomer prolongs the action potential (Class III)
 - b) The l-isomer prolongs the action potential (Class III)
 - c) The d-isomer blocks beta-receptors (Class II)
 - d) The l-isomer blocks beta-receptors (Class II)
- 35.1) An obese patient is being implanted with an ICD. During implantation, the physician induces ventricular fibrillation via T-shock. The device recognizes the rhythm and shocks within 5 seconds. However, even at full power the device is not able to defibrillate successfully. Which of the following drugs could be given to improve the chances of successful defibrillation?
- a) Sotalol
 - b) Adenosine
 - c) Lidocaine
 - d) Flecainide
 - e) Atropine
- 35.2) Which of the following is NOT a therapeutic use of sotalol?
- a) Maintenance of sinus rhythm in patients with atrial fibrillation
 - b) For patients with supraventricular arrhythmias
 - c) For patients with multi-focal PVCs
 - d) For patients with life-threatening ventricular arrhythmias
- 36) What is the most common dose-related toxicity associated with sotalol?
- a) Renal failure
 - b) Hepatic dysfunction
 - c) Cutaneous emphysema
 - d) Hypertension
 - e) Torsade de Pointes
- 37) Which of the following Class III drugs activates the slow inward sodium current?
- a) Amiodarone (Pacerone)
 - b) Sotalol (Betapace)
 - c) Ibutilide (Corvert)
 - d) Dofetilide (Tikosyn)
 - e) Nibentan

- 38) What is the most common dose-related toxicity associated with ibutilide and dofetilide?
- a) Renal failure
 - b) Hepatic dysfunction
 - c) Cutaneous emphysema
 - d) Hypertension
 - e) Torsade de Pointes
- 39) What is the major extracardiac effect of verapamil (Covera)?
- a) Vasodilation
 - b) Vasoconstriction
 - c) Renal sodium excretion
 - d) Renal sodium retention
 - e) Thyroid hormone release
- 40) Which of the following is a common error in the administration of verapamil?
- a) Giving to a patient in VF misdiagnosed as SVT
 - b) Giving to a patient in VT misdiagnosed as SVT
 - c) Giving to a patient in SVT misdiagnosed as VF
 - d) Giving to a patient in SVT misdiagnosed as VT
 - e) Giving to a patient in SVT misdiagnosed as TdP
- 41) What is the approximate difference in dosing for verapamil when comparing the two common routes of administration?
- a) IM 10-100 times greater than PO
 - b) PO 10-100 times greater than IM
 - c) IV 10-100 times greater than PO
 - d) PO 10-100 times greater than IV
 - e) IO 10-100 times greater than ET
- 42) Which of the following is a major therapeutic use of verapamil?
- a) Conversion of ventricular fibrillation
 - b) Conversion of ventricular tachycardia
 - c) Conversion of atrial fibrillation
 - d) Conversion of atrial flutter
 - e) Conversion of supraventricular tachycardia
- 43) Which of the following is a major therapeutic use of diltiazem?
- a) Conversion of ventricular fibrillation
 - b) Conversion of ventricular tachycardia
 - c) Conversion of atrial fibrillation
 - d) Conversion of atrial flutter
 - e) Conversion of supraventricular tachycardia
- 44) Which of the following is NOT true regarding adenosine (Adenocard)?
- a) It must be administered IV rapid push followed by a bolus of saline due to a short half-life
 - b) It is a nucleoside in the body and acts as a pure agonist
 - c) It activates calcium currents
 - d) It activates inward rectifier potassium currents
 - e) It suppresses calcium-dependent action potentials

45) A patient presents with paroxysmal supraventricular tachycardia (PSVT) and is asked to bear-down. If the vagal maneuver does not convert the rhythm, which of the following would be given as the drug of choice?

- a) Verpamil
- b) Diltiazem
- c) Adenosine
- d) Atropine
- e) Amiodarone

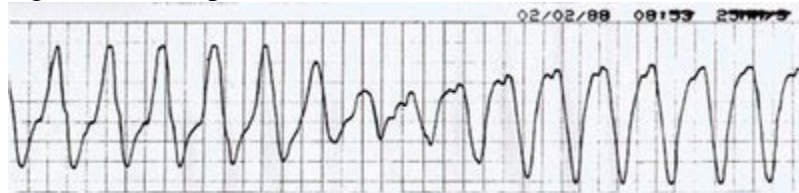
46) Along with theophylline, which of the following drugs would antagonize adenosine and thus render it less effective?

- a) Verapamil
- b) Diltiazem
- c) Sotalol
- d) Phenytoin
- e) Caffeine

47) What is the most common side effect seen after the administration of adenosine?

- a) High grade AV block
- b) Cutaneous flushing
- c) Atrial fibrillation
- d) Hypotension
- e) Headache

48) A hospitalized patient receiving quinidine for cardiac arrhythmias presents unconscious after taking their daily medications. No breathing or pulse is found and CPR is begun. An IV is inserted and a cardiac monitor is connected (rhythm below). What drug should be given for this patient?



- a) Adenosine
- b) Digoxin
- c) Diltiazem
- d) Verapamil
- e) Magnesium

49) A patient receiving digoxin therapy would be most likely to have adverse effects if they had which of the following electrolyte abnormalities?

- a) Hypokalemia
- b) Hyperkalemia
- c) Hypocalcemia
- d) Hypercalcemia
- e) Hyponatremia

Cardiology #8 – Pathophysiology & Diagnosis of Heart Failure

1) Which of the following would most increase capillary hydrostatic pressure and thus lead to pulmonary congestion?

- a) Left ventricular diastolic dysfunction
 - b) Right ventricular diastolic dysfunction
 - c) Left atrial systolic dysfunction
 - d) Right atrial systolic dysfunction
- 2) Which of the following would NOT be used to prevent or treat left ventricular remodeling due to heart failure and the release of endogenous neurohormonal compounds?
- a) ACE inhibitors to slow the remodeling
 - b) Beta blockers to slow the remodeling
 - c) NSAIDS to reverse the remodeling
 - d) Biventricular pacemaker to coordinate contractions
- 3) What type of lung sound would most likely be heard in a patient with severe left-sided heart failure?
- a) Stridor
 - b) Rales
 - c) Wheeze
 - d) Stertor
 - e) Normal
- 4) Which of the following would NOT likely be seen in a patient with right-sided heart failure?
- a) Jugular venous distention (JVD)
 - b) Gastrointestinal complaints
 - c) Hepatic and bowel edema
 - d) Peripheral edema and ascities
 - e) Pleural effusions
- 5) Along with pulmonary vascular disease, which of the following is a common cause of right ventricular pressure overload?
- a) Peripheral hypertension
 - b) Aortic stenosis
 - c) Rheumatic heart disease
 - d) Cor pulmonale
 - e) Arterial thrombi
- 6) What proportion of patients with heart failure have normal ejection fractions?
- a) Nearly 0%
 - b) 5-10%
 - c) 15-25%
 - d) 20-40%
 - e) 45-60%

Cardiology #9 – Management of Heart Failure

- 1) Which of the following is NOT true regarding neurohormonal antagonists in the treatment of heart failure?
- a) ACE inhibitors are the primary means of inhibiting the neurohormonal system
 - b) ACE inhibitors interfere with the renin-angiotensin system (RAS)
 - c) ACE inhibitors prevent the conversion of angiotensin I to angiotensin II
 - d) ACE inhibitors improve the actions of kinins (kinin-kallikrein system)

- e) ACE inhibitors are less effective when co-administered with aspirin
- 2) Which of the following ACE inhibitors is used to test for renal artery stenosis (challenge test) as well as primary aldosteronism: Conn syndrome (suppression test)?
- a) Captopril (Capoten)
 - b) Enalapril maleate (Innovace)
 - c) Fosinopril (Staril)
 - d) Lisinopril (Zestril)
 - e) Quinapril (Accupro)
 - f) Ramipril (Tritace)
- 3) Which of the following classes of medication have been proven to reduce mortality in heart failure due to left ventricular systolic dysfunction?
- a) Calcium-channel blockers
 - b) NSAIDS
 - c) ACE inhibitors
 - d) Class I antiarrhythmics
 - e) Loop diuretics
- 4) Neurohormonal antagonists (ACE inhibitors) should be discontinued if a patient develops which of the following?
- a) Decreased blood pressure
 - b) Increased blood urea nitrogen (BUN)
 - c) Dizziness
 - d) A nonproductive cough
 - e) Angioedema
- 5) What is the principle source of the cardiac glycosides (cardenolides)?
- a) Coca plant
 - b) Amanita fungi
 - c) Foxglove plant
 - d) Poppy plant
 - e) Gingko biloba plant
- 6) A hospitalized patient on a cardenolide is treated for an acquired infection with erythromycin. Which of the following could happen?
- a) If the glycoside is digitoxin, it could become much less bioavailable leading to arrhythmias
 - b) If the glycoside is digitoxin, it could become much more bioavailable leading to digitoxin poisoning
 - c) If the glycoside is digoxin, it could become much less bioavailable leading to arrhythmias
 - d) If the glycoside is digoxin, it could become much more bioavailable leading to digoxin poisoning
- 7) Which of the following is true regarding the cardiac glycosides?
- a) They have a narrow therapeutic window
 - b) They have a very high LD50
 - c) They have a very low ED50
 - d) They lose their affect at very high doses
 - e) They become toxic if combined with grapefruit juice

- 8) Which of the following describes the fundamental pharmacodynamics action of the cardiac glycosides?
- Inhibition of Ca^{++} ATPase
 - Inhibition of $\text{Na}^{+}/\text{K}^{+}$ ATPase
 - Inhibition of $\text{Na}^{+}/\text{Cl}^{-}$ symporter
 - Inhibition of dopamine transporter
 - Inhibition of glutamate transporter
- 9) What is the therapeutic action of digitalis on the mechanical function of cardiac contractile cells?
- Decreases free calcium and the intensity of actin/myosin interaction
 - Decreases intracellular sodium leading to stronger muscle stroke
 - Increases free calcium and the intensity of actin/myosin interaction
 - Increases intracellular sodium leading to stronger muscle stroke
- 10) Which of the following is true regarding the mechanism of digitalis?
- Increase intracellular sodium and decreases calcium expulsion from the cell
 - Decreases intracellular sodium and decreases calcium expulsion from the cell
 - Increase intracellular sodium and increases calcium expulsion from the cell
 - Decreases intracellular sodium and increases calcium expulsion from the cell
- 11) Which of the following ECG changes is seen in patients taking digitalis?
- QT interval prolongation and ST elevation
 - QT interval prolongation and ST depression
 - QT interval shortening and ST elevation
 - QT interval shortening and ST depression
- 12) Which of the following arrhythmias is most likely to occur at the onset of digitoxin poisoning?
- Ventricular fibrillation
 - Ventricular tachycardia
 - Torsade de Pointes
 - Ventricular bigeminy
 - Atrial trigeminy
- 13) Which of the following would be seen at therapeutic levels of cardiac glycosides?
- Second degree AV blockade
 - Premature ventricular contractions
 - Increased sympathetic outflow
 - AV junctional rhythm
 - Central vagal stimulation
- 14) Which of the following is the most common area of extracardiac toxicity for digitalis?
- Breast tissue (gynecomastia)
 - Central nervous system
 - Gastrointestinal system
 - Hepatic system
 - Thyroid system
- 15) Which of the following would increase the affects of digitalis and thus increase the chances of an arrhythmia due to toxicity?
- Hyperkalemia

- b) Hypercalcemia
 - c) Hypermagnesemia
 - d) Phenytoin
 - e) Digoxin immune Fab
- 16) Which of the following describes the pharmacodynamics actions of the bipyridines amrinone (Inocore) and milrinone (Primacor)?
- a) They are phosphodiesterase III inhibitors
 - b) They decrease inward calcium flux in the heart
 - c) They decrease myocardial contractility
 - d) They are vasoconstrictors
 - e) They decrease the available cAMP
- 17) When are bipyridines (amrinone, milrinone) indicated?
- a) Pediatric septic shock with heart failure
 - b) Exacerbation of chronic heart failure
 - c) Acute decompensate heart failure
 - d) A & C
 - e) All of the above
- 18) What is the most common side effect seen with bipyridines?
- a) Nausea and vomiting
 - b) Ventricular arrhythmias
 - c) Thrombocytopenia
 - d) Liver enzyme changes
 - e) Liver toxicity
- 19) What is the primary pharmacodynamic action of dobutamine?
- a) Beta1 agonist
 - b) Beta2 agonist
 - c) Beta1 antagonist
 - d) Beta2 antagonist
 - e) Na⁺/K⁺ ATPase inhibitor
- 20) Which of the following patients would be indicated for dobutamine?
- a) Pulmonary edema
 - b) Berry aneurysms
 - c) Cardiogenic shock
 - d) Kawasaki disease
 - e) Hypertension
- 21) What is the basic mechanism shared by most diuretics?
- a) Increased sodium and chloride reabsorption
 - b) Decreased sodium and chloride reabsorption
 - c) Increased sodium and chloride excretion
 - d) Decreased sodium and chloride excretion
- 22.1) Loop diuretics (e.g. furosemide, ethacrynic acid, bumetanide, torsemide) have their principal diuretic effect on the:
- a) Ascending limb of loop of Henle
 - b) Distal convoluted tubule
 - c) Proximal convoluted tubule
 - d) Descending limb of loop of Henle

- e) Collecting ducts
- 22.2) Thiazide diuretics (e.g. chlorothiazide, hydrochlorothiazide) have their principal diuretic effect on the:
- a) Ascending limb of loop of Henle
 - b) Distal convoluted tubule
 - c) Proximal convoluted tubule
 - d) Descending limb of loop of Henle
 - e) Collecting ducts
- 22.3) Which of the following blocks aldosterone at the distal nephron?
- a) Loop diuretics
 - b) Osmotic diuretics
 - c) Thiazide diuretics
 - d) Potassium-sparing diuretics
- 22.4) Which of the following would be used to get fluid into the interstitial space for a patient with head trauma and increased intracranial pressure?
- a) Loop diuretics
 - b) Osmotic diuretics
 - c) Thiazide diuretics
 - d) Potassium-sparing diuretics
- 23) Which of the following has the quickest onset and shortest duration and thus would be helpful for relieving fluid overload in an emergency situation?
- a) Loop diuretics
 - b) Osmotic diuretics
 - c) Thiazide diuretics
 - d) Potassium-sparing diuretics
- 24.1) Which of the following indications for diuretics is preventative?
- a) Hypertension
 - b) Heart failure
 - c) Cirrhosis
 - d) Pulmonary edema
 - e) Renal failure
- 24.2) What type of diuretics are the drug of choice for essential hypertension?
- a) Loop diuretics
 - b) Osmotic diuretics
 - c) Thiazide diuretics
 - d) Potassium-sparing diuretics
- 25.1) A patient is taking unknown diuretics and presents with hypotension, hyponatremia, and hearing loss. They are also taking an aminoglycoside antibiotic. Which of the following is the patient likely taking?
- a) Loop diuretic
 - b) Osmotic diuretic
 - c) Thiazide diuretic
 - d) Potassium-sparing diuretic, aldosterone antagonist
 - e) Potassium-sparing diuretic, nonaldosterone antagonist
- 25.2) Which of the following diuretics could cause fatal dysrhythmias due to hyperkalemia?

- a) Furosemide (Lasix)
 - b) Hydrochlorothiazide (HCTZ)
 - c) Spironolactone (Aldoctone)
 - d) Mannitol
- 26.1) Which of the following diuretics would prevent excretion of lithium (bipolar disorder treatment), which could allow it to reach toxic levels?
- a) Loop diuretics
 - b) Thiazide diuretics
 - c) Osmotic diuretics
 - d) Potassium-sparing diuretics
 - e) A & B
- 26.2) Which of the following prevents the increase in renal blood flow with furosemide, thus partially blunting the diuretic effect?
- a) NSAIDs
 - b) Class Ia antiarrhythmics
 - c) Class III antiarrhythmics
 - d) Beta-blockers
 - e) Calcium-channel blockers
- 26.3) Which of the following types of diuretics can cause gynecomastia, menstrual irregularities, impotence, hirsutism, and deepening of voice?
- a) Loop diuretics
 - b) Thiazide diuretics
 - c) Osmotic diuretics
 - d) Potassium-sparing diuretics
 - e) A & B
- 26.4) Which of the following types of diuretics interacts with ACE inhibitors?
- a) Loop diuretics
 - b) Thiazide diuretics
 - c) Osmotic diuretics
 - d) Potassium-sparing diuretics
 - e) A & B
- 27) What are the useful effects (mechanism of action) of diuretics in the management of congestive heart failure?
- a) Reduced peripheral resistance and reduced heart rate
 - b) Reduced ventricular preload and reduced venous pressure
 - c) Increased atrial preload and increased stroke volume
 - d) Increased lusitropy and greatly decreased ionotropy
 - e) Reduced ventricular afterload and increased heart rate
- 28) The RALES study showed a decrease in morbidity and mortality in patients with severe heart failure receiving ACE inhibitors and what diuretic?
- a) Furosemide (Lasix)
 - b) Hydrochlorothiazide (HCTZ)
 - c) Spironolactone (Aldoctone)
 - d) Triamterene (Dyrenium)
 - e) Mannitol

- 29) Which of the following is NOT a mechanism of action of angiotensin-converting enzyme (ACE) inhibitors for congestive heart failure?
- Reduction in peripheral resistance
 - Reduction in salt and water retention
 - Reduction in sympathetic activity
 - Reduction in long-term heart remodeling
 - Reduction in chronotropy
- 30) Cardiac remodeling in heart failure can be reduced with the combination of hydralazine (Apresoline), isosorbide (Imdur), and vasodilators, which have what major mechanism of action?
- Reducing heart rate
 - Reducing afterload
 - Reducing preload
 - Increasing lusitropy
 - Increasing inotropy
- 31) Although this type of drug can precipitate acute decompensation of cardiac function, most patients with chronic heart failure respond favorably (a paradox).
- Diuretic
 - Class I antiarrhythmic
 - Class II antiarrhythmic
 - Class III antiarrhythmic
 - Class VI antiarrhythmic
- 32) Which of the following beta-blockers was NOT shown to reduce mortality in patients with stable severe heart failure (NYHA II/III)? (Trials: CAPRICORN, CIBIS-II, COMET, COPERNICUS, MERIT-HF)
- Bucindolol
 - Bisoprolol
 - Carvedilol
 - Metoprolol
- 33) Digitalis can reverse signs and symptoms of congestive heart failure via what mechanism?
- Reducing heart rate
 - Reducing afterload
 - Reducing preload
 - Increasing lusitropy
 - Increasing inotropy
- 34) Which of the following drugs can interact with digoxin binding sites and lead to a largely increased bioavailability of digoxin?
- Furosemide
 - Quinidine
 - Triamterene
 - Erythromycin

- 35.1) A patient presents in junctional tachycardia with ECG complexes as shown here. The patient is currently being treated for a digestive tract infection and is on an unknown inotropic drug. Which of the following should be done for this patient?



- a) Halt the antibiotic and give the patient oral potassium
 - b) Halt the inotrope and give the patient oral potassium
 - c) Halt the antibiotic and implant a pacemaker
 - d) Halt the inotrope and implant a pacemaker
 - e) Immediately administer epinephrine
- 35.2) A child presents with confusion, weakness, and syncope. History reveals they ingested a few of their father's digoxin (Lanoxin) pills. Blood is drawn for electrolyte analysis, but the clinician suspects normal values. Which of the following is the best treatment for acute overdose of digitalis as seen in this patient?
- a) IV potassium and ECG monitoring
 - b) IV lidocaine and flecainide for ventricular arrhythmias
 - c) IV potassium and IV lidocaine
 - d) IV calcium, potassium, and magnesium as needed
 - e) Temporary cardiac pacemaker and digitalis antibodies

Cardiology #10 – Cardiac Transplantation

- 1) What is the approximate five-year survival rate for cardiac transplantation?
- a) 90-100%
 - b) 80-90%
 - c) 70-80%
 - d) 60-70%
 - e) 50-60%
- 2) A cardiac transplant patient develops a new S3 gallop and presents with dyspnea and hypotension. Which of the following tests is the standard for detecting early signs of cardiac allograft rejection?
- a) Echocardiography
 - b) Endomyocardial biopsy
 - c) Electrophysiology study
 - d) Nuclear imaging
 - e) Amyl nitrite test

Cardiology #11 – Systemic Hypertension

- 1) According to The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7 Report), what is the systolic and diastolic blood pressures associated with State 1 hypertension?
- a) 120-129 / 80-89
 - b) 140-159 / 70-79
 - c) 140-159 / 80-89
 - d) 140-159 / 90-99
 - e) > 160 / > 100
- 2) What is the most common cause of essential (primary) hypertension?
- a) Aneurysm
 - b) Hyperlipidemia
 - c) Idiopathic
 - d) Vasoconstriction
 - e) Diabetes

- 3) Approximately what percentage of all hypertension is essential?
- a) 50-55%
 - b) 60-65%
 - c) 70-75%
 - d) 80-85%
 - e) 90-95%
- 4) Secondary hypertension usually arises from renal retention of salt and water or what other cause?
- a) Aneurysm
 - b) Hyperlipidemia
 - c) Idiopathic
 - d) Vasoconstriction
 - e) Diabetes
- 5) A patient presents with acute, severe, hypertension with no signs of organ dysfunction (hypertensive urgency). Which of the following is the recommended treatment?
- a) Oral hypertensive medications and follow-up
 - b) IV hypertensive medications and follow-up
 - c) ICU admission, IV fluids, and continuous BP monitoring
 - d) ICU admission, oral glucose, and continuous BP monitoring
 - e) No treatment is necessary for this patient
- 6) A patient presents with acute, severe, hypertension with progressive organ system dysfunction (hypertensive emergency). Which of the following is the recommended treatment?
- a) Oral hypertensive medications and follow-up
 - b) IV hypertensive medications and follow-up
 - c) ICU admission, IV fluids, and continuous BP monitoring
 - d) ICU admission, oral glucose, and continuous BP monitoring
 - e) No treatment is necessary for this patient
- 7) Which of the following describes white coat hypertension?
- a) Increased BP seen in the clinic due to fear of the physician
 - b) Increased BP seen in the clinic due to anxiety about the reading
 - c) Increased BP seen in the clinic due to fear of heart problems
 - d) Increased BP seen in the clinic due to long wait times
 - e) Increased BP seen in the clinic due to more accurate readings
- 8) A pregnant patient presents to the primary care clinic for a check-up. The clinician assesses blood pressure with a regular adult cuff, which was used for this patient on their original visit. However, the patient has gained weight since the original visit and is outside of the cuff diameter range. Which of the following is most likely to be seen?
- a) False hypotension
 - b) True hypotension
 - c) False hypertension
 - d) True hypertension
 - e) No change in reading accuracy
- 9.1) A pregnant patient with a history of gout presents with congestive heart failure. Which of the following would be the best choice of antihypertensive medication?
- a) Diuretic

- b) Beta-blocker
 - c) ACE inhibitor
 - d) Angiotensin receptor blocker (ARB)
 - e) Calcium-channel blocker
- 9.2) A patient with COPD suffers an MI. Which of the following drugs should be given to decrease mortality after the MI?
- a) Diuretic
 - b) Beta-blocker
 - c) ACE inhibitor
 - d) Angiotensin receptor blocker (ARB)
 - e) Calcium-channel blocker
- 9.3) Which of the following is indicated for pheochromocytoma and prostatic hypertrophy?
- a) Alpha-blocker
 - b) Beta-blocker
 - c) Calcium-channel blocker
 - d) ACE inhibitor
 - e) Angiotensin receptor blocker (ARB)
- 9.4) Which of the following would be best for isolated hypertension in a diabetic patient?
- a) Alpha-blocker
 - b) Beta-blocker
 - c) Angiotensin receptor blocker
 - d) Dihydropyridine CCB
 - e) Non-dihydropyridine CCB
- 9.5) What is the desirable drug therapy to use for a patient with Prinzmetal angina?
- a) Alpha-blocker
 - b) Beta-blocker
 - c) Calcium-channel blocker
 - d) Angiotensin receptor blocker
 - e) Potassium-sparing diuretics
- 9.6) Which of the following should be avoided in a patient with osteoporosis?
- a) Loop diuretics
 - b) Thiazide diuretics
 - c) Osmotic diuretics
 - d) Potassium-sparing diuretics
 - e) A & B
- 9.7) Which of the following is a desirable drug therapy for migraine cephalgia?
- a) Alpha-blocker
 - b) Beta-blocker
 - c) Calcium-channel blocker
 - d) Osmotic diuretic
 - e) Loop diuretic
- 9.8) Beta-blockers, central alpha-agonists, and reserpine (Harmony) should be avoided in which of the following patients?
- a) Truck drivers
 - b) Past MI

- c) History of depression
 - d) Sexually active men
 - e) Gout
- 10) Weight reduction even without sodium restriction has been shown to normalize blood pressure in up to what percentage of overweight patients with mild to moderate hypertension?
- a) 25%
 - b) 50%
 - c) 60%
 - d) 75%
 - e) 95%
- 11) Initially, diuretics reduce blood volume and therefore cardiac output. What is the mechanism by which diuretics have their sustained effect?
- a) Move fluid from tissue into the vasculature
 - b) Increase peripheral vascular resistance
 - c) Increase right ventricular filling and preload
 - d) Deplete potassium stores in the body
 - e) Deplete sodium stores in the body
- 12) What is the role that sodium is believed to play in vascular resistance?
- a) Decreases resistance by vasodilation
 - b) Increases resistance by vasoconstriction
 - c) Decreases resistance by decreased vessel compliance
 - d) Increases resistance by increased vessel compliance
 - e) Decreases resistance by vasoconstriction and increases blood viscosity
- 13) Which of the following diuretics inhibits smooth muscle response to contractile stimuli, probably through effects on transmembrane and intracellular calcium movements that are independent of its action on sodium excretion?
- a) Indapamide (Lozol)
 - b) Amiloride (Midamor)
 - c) Furosemide (Lasix)
 - d) Spironolactone (Aldoctone)
 - e) Triamterene (Dyrenium)
- 14) Which of the following describes the effectiveness of diuretic monotherapy on hypertensive patients?
- a) 5-10mmHg decrease for symptomatic patients over the first week
 - b) 10-15mmHg decrease for symptomatic patients over the first week
 - c) 5-10mmHg decrease for most patients
 - d) 10-15mmHg decrease for most patients
 - e) 20mmHg decrease for all patients
- 15) What is the mechanism of action by which diuretics act synergistically with other antihypertensive medications?
- a) Prevent water retention
 - b) Ensure BP is sensitive to blood volume
 - c) Control sodium retention
 - d) Prevent side effects
 - e) Reduce chances of hypotension

- 16) Thiazide diuretics are indicated for which of the following hypertensive patients?
- a) Cardiac failure
 - b) Renal insufficiency
 - c) Cirrhosis
 - d) Severe hypertension
 - e) None of the above
- 17) Which of the following diuretics is appropriate for patients taking digitalis?
- a) Thiazides
 - b) Loop diuretics
 - c) Potassium-sparing
- 18) What is the most common adverse effect of the central alpha-adenoreceptor agonist methyldopa (Aldomet)?
- a) Impaired mentation
 - b) Nightmares
 - c) Vertigo
 - d) Overt sedation
 - e) Extrapyrarnidal signs (e.g. akinesia, akathisia)
- 19) Which of the following can occur in patients who suddenly stop taking the hypertension medication clonidine (Catapres)?
- a) Postural hypotension
 - b) Hypertensive crisis
 - c) Dry mouth and sedation
 - d) Mental depression
 - e) Nightmares
- 20) Which of the following side-effects (sympathoplegic and parasympathoplegic) is the reason why ganglion blocking agents have been almost completely abandoned for the treatment of hypertension?
- a) Constipation
 - b) Sexual dysfunction
 - c) Urinary retention
 - d) Glaucoma and blurred vision
 - e) All of the above
- 21) The rarely used hypertensive medication guanethidine (Ismelin) can interact dangerously with certain drugs (cocaine, amphetamines, TCAs) and is contraindicated in patients with pheochromocytoma because its mechanism of action is to:
- a) Deplete norepinephrine stores
 - b) Deplete epinephrine stores
 - c) Increase intracranial pressure
 - d) Retain salt and potassium
 - e) Cause urinary excretion of water
- 22) What is the major reason that guanethidine is rarely used as a drug of choice?
- a) It causes diarrhea
 - b) It causes postural hypotension
 - c) It impairs ejaculation
 - d) It is too polar to enter the CNS
 - e) Better medications have been developed

- 23) Due to its effects on depleting norepinephrine, dopamine, and serotonin, the drug reserpine (Harmony) is contraindicated in patients with gastric ulcers or who have:
- Diabetes
 - Hypertension
 - Depression
 - Heart failure
 - Huntington disease
- 24) Which of the following is a typical use for the non-selective beta-blocker propranolol (Inderal)?
- To increase heart rate in bradycardic patients
 - For hypertension in patients with heart failure
 - For hypertension in patients with AV nodal block
 - For hypertension in patients with pulmonary stenosis
 - For hypertension in patients with tardive dyskinesia
- 25.1) Which of the following beta-blockers is used for management of intraoperative and postoperative hypertension, and sometimes for hypertensive emergencies, particularly when hypertension is associated with tachycardia?
- Metoprolol
 - Nadolol, Carteolol, Atenolol, Betaxolol, Bisoprolol
 - Pindolol, Acebutolol, Penbutolol
 - Labetalol, Carvedilol
 - Esmolol
- 25.2) Which of the following beta-blockers is particularly beneficial for patients with bradyarrhythmias, peripheral vascular disease, or intrinsic sympathomimetic activity (ISA)?
- Metoprolol
 - Nadolol, Carteolol, Atenolol, Betaxolol, Bisoprolol
 - Pindolol, Acebutolol, Penbutolol
 - Labetalol, Carvedilol
 - Esmolol
- 25.3) Which of the following beta-blocker has cardiac selectivity that may be advantageous in treating hypertensive patients who also suffer from asthma, diabetes, or peripheral vascular disease?
- Metoprolol
 - Nadolol, Carteolol, Atenolol, Betaxolol, Bisoprolol
 - Pindolol, Acebutolol, Penbutolol
 - Labetalol, Carvedilol
 - Esmolol
- 25.4) Which of the following beta-blockers has combined alpha and beta blocking activity and thus is useful in treating the hypertension of pheochromocytoma and hypertensive emergencies, such as lowering blood pressure in stroke prior to giving tPA?
- Metoprolol
 - Nadolol, Carteolol, Atenolol, Betaxolol, Bisoprolol
 - Pindolol, Acebutolol, Penbutolol
 - Labetalol, Carvedilol
 - Esmolol

- 25.5) Which of the following beta-blockers has a long half-life and therefore can be administered once daily, is used in the prevention of re-bleeding in the setting of bleeding secondary to portal hypertension, and is used for glaucoma?
- a) Metoprolol
 - b) Nadolol, Carteolol, Atenolol, Betaxolol, Bisoprolol
 - c) Pindolol, Acebutolol, Penbutolol
 - d) Labetalol, Carvedilol
 - e) Esmolol
- 26) Which of the following is NOT an indication for beta-blockers?
- a) Mitral valve prolapse
 - b) Migraine prophylaxis
 - c) Asthmatic crisis
 - d) Essential tremor
 - e) Hypertension
- 27) What is the first-dose phenomenon seen when administering the alpha1-blocking agents prazosin (Minipress), terazosin (Hytrin), and doxazosin (Cardura)?
- a) Retention of sodium and water
 - b) Positive test for antinuclear factor
 - c) Drop in standing blood pressure
 - d) Extreme dizziness and palpitations
 - e) Lassitude
- 28) Polypharmacy is rationalized in the administration of vasodilators with antihypertensive medications as each drug works on one set of interacting, mutually compensatory regulatory mechanisms for maintaining blood pressure.
- a) True
 - b) False, one drug should be given at a time
 - c) False, vasodilators and antihypertensives oppose each other
- 29) Vasodilator therapy does NOT cause orthostatic hypotension or sexual dysfunction because:
- a) They do not affect the parasympathetic system
 - b) The sympathetic reflexes are intact
 - c) The baroreceptor reflex is blunted
 - d) Salt and water retention compensate
 - e) Co-administration with other drugs is required
- 30) Which of the following is a vasodilator with high first-pass liver metabolism, has pharmacokinetics that include rapid versus slow acetylators, and may cause SLE-like symptoms?
- a) Diazoxide (Proglycem)
 - b) Fenoldopam (Corlopam)
 - c) Nitroprusside (Nitropress)
 - d) Minoxidil (Rogaine)
 - e) Hydralazine (Apresoline)
- 31) Which of the following opens potassium channels in smooth muscle and must be administered with a beta-blocker and a loop diuretic?
- a) Minoxidil (Rogaine)
 - b) Diazoxide (Proglycem)

- c) Hydralazine (Apresoline)
 - d) Nitroprusside (Nitropress)
 - e) Fenoldopam (Corlopam)
- 32) Which of the following is NOT true regarding nitroprusside?
- a) It enters red blood cells and liberates cyanide
 - b) It dilates arterioles but not venous vessels
 - c) It results in increased intracellular cGMP
 - d) It rapidly lowers blood pressure
 - e) It may cause thiocyanate to accumulate in patients with renal disease
- 33) Which of the following drugs led to excessive hypotension with a recommendation to give a fixed (high) dose to all patients, which could result in stroke or MI?
- a) Minoxidil (Rogaine)
 - b) Diazoxide (Proglycem)
 - c) Hydralazine (Apresoline)
 - d) Nitroprusside (Nitropress)
 - e) Fenoldopam (Corlopam)
- 34) Which of the following drugs for hypertension acts primarily on the dopamine D1 receptors and should be avoided in patients with glaucoma?
- a) Diazoxide (Proglycem)
 - b) Minoxidil (Rogaine)
 - c) Hydralazine (Apresoline)
 - d) Fenoldopam (Corlopam)
 - e) Nitroprusside (Nitropress)
- 35) Which of the following calcium-channel blockers is more selective as a vasodilator?
- a) Nifedipine (Procardia)
 - b) Verapamil (Covera)
 - c) Diltiazem (Cardiazem)
- 36) ACE inhibitors block which of the following in the renin-angiotensin-aldosterone system (RAAS)?
- a) Renin
 - b) Chymase
 - c) Kininase I
 - d) Kininase II
 - e) Aldosterone
- 37) Which of the following is NOT a side effect of ACE inhibitors?
- a) Dry cough
 - b) Hypokalemia
 - c) Angioedema
 - d) Hypotension
 - e) Rash
- 38) Which of the following ACE inhibitors is NOT a prodrug?
- a) Captopril
 - b) Enalapril
 - c) Lisinopril
 - d) Benazapril
 - e) Fosinopril

- 39) Angiotensin receptors blockers (ARBs) would have no affect on which of the following (component of a separate system)?
- a) Renin
 - b) Kininase
 - c) Bradykinin
 - d) Angiotensin I
 - e) Angiotensin II
- 40) Which of the following, along with angioedema, is far less likely to occur with ARBs when compared to ACE inhibitors as other enzymes are capable of generating angiotensin II?
- a) Dry cough
 - b) Hyperkalemia
 - c) Renal failure
 - d) Hypotension
 - e) Rash
- 41) Which of the following ARB has the highest AT1 affinity and shortest half-life?
- a) Losartan (Cozaar)
 - b) Valsartan (Diovan)
 - c) Candesartan (Atacand)
 - d) Eprosartan (Teveten)
 - e) Irbesartan (Avapro)
- 42) A patient is admitted to the intensive care unit for hypertensive emergency. They are given sodium nitroprusside and labetalol to lower their blood pressure, ensuring diastolic pressure is no less than 100-110mmHg. How much should the systolic pressure be lowered?
- a) It should not be lowered
 - b) By 25%
 - c) By 50%
 - d) By 75%
 - e) Until it is below 140mmHg
- 43) Which of the following is a potent vasoconstrictor, adding to hypertension?
- a) Renin
 - b) Angiotensinogen
 - c) Angiotensin I
 - d) Angiotensin II
 - e) Aldosterone
- 44) How much more likely are patients with untreated hypertension to suffer a heart attack or stroke?
- a) Half as likely
 - b) 1.5 times more likely
 - c) 2-3 times more likely
 - d) 5-6 times more likely
 - e) 8-10 times more likely
- 45) Which of the following is NOT a risk factor for developing hypertension and the associated health risks?
- a) Age > 65

- b) Obesity
 - c) Low socioeconomic class
 - d) Being Caucasian
 - e) Alcoholism
- 46) What percentage of patients with hypertension are salt sensitive?
- a) 10-25%
 - b) 30-40%
 - c) 50-60%
 - d) 70-80%
 - e) 90-95%
- 47.1) A 65-year-old black female comes to your office for a follow-up of persistently elevated blood pressure. Her BMI is 25, she doesn't smoke or drink alcohol, and she gets regular physical exercise. She is anxious to lower her blood pressure because she knows it affects heart disease and she has a sister who just died of heart disease. You decide the first step in therapy should be restricting the diet in:
- a) Potassium
 - b) Calcium
 - c) Cholesterol
 - d) Fat
 - e) Sodium
- 47.2) A 66-year-old obese black male comes to see you about his Type 2 diabetes. In looking over his chart, you see that since his last visit he has developed mild hypertension. You check the blood pressure on several more occasions and it is still high. In order to decide how to treat the hypertension, you ask the patient if he is willing to go on a diet to restrict:
- a) Calcium
 - b) Potassium chloride
 - c) Sodium chloride
 - d) Magnesium
 - e) Folate
- 47.3) A 50-year-old man comes in complaining of lack of energy. He has gained 25 pounds since you last saw him 5 years ago. He has stopped exercising because of knee problems. His blood pressure is significantly elevated since his last visit. You want to assess his intake of sodium. In addition to asking him about salt added to his food, you ask him about his intake of:
- a) Diet sodas
 - b) Processed foods
 - c) Canned fruits
 - d) Plain frozen vegetables
 - e) Fresh meats and vegetables
- 47.4) A hypertensive patient asks about following a 2,000 calorie DASH eating pattern. How many servings of fruits and vegetables should she eat each day?
- a) 1-2
 - b) 3-5
 - c) 6-7
 - d) 8-10

- e) 11-14
 - f) 15 or more
- 47.5) What lifestyle intervention can be expected to decrease systolic blood pressure by 8-14mmHg?
- a) Adding 5 servings of fruit per day
 - b) Following a DASH eating pattern
 - c) Increasing calcium intake
 - d) Limiting alcohol consumption
 - e) Losing two pounds
- 47.6) A 72-year-old black male comes to your office because he had his blood pressure taken at the mall and it was too high. You take his blood pressure on two more occasions and find that it is mildly elevated. You decide as a first step to restrict:
- a) Milk
 - b) Caffeine
 - c) Fats and oils
 - d) Hot spices
 - e) Table salt
- 47.7) A patient with newly diagnosed hypertension asks about dietary measures to reduce hypertension. You suggest trying the following:
- a) Use a supplement with iron and zinc
 - b) Use manganese and chromium supplements
 - c) Eat more potassium and calcium-rich foods
 - d) Increase protein and copper intake
 - e) Avoid starches and sugars
- 48.1) What is the recommended maximal amount of daily salt for treatment and prevention of hypertension?
- a) 30mg
 - b) 300mg
 - c) 1,300mg
 - d) 2,300mg
 - e) 3,300mg
 - f) 3,500mg
- 48.2) A 51-year-old woman comes to see you about her weight, which has been slowly rising over the last 10 years to a BMI of 30. You find that she now is consistently hypertensive. The dietary intervention that will probably be most effective is:
- a) Sodium reduction
 - b) Increased exercise
 - c) 10-15 pound weight loss
 - d) Increased dietary calcium
 - e) Reduction in alcohol intake
- 48.3) A 64-year-old man does not respond to his blood-pressure lowering medication despite reliable use. He has cereal with fruit for breakfast, a light lunch, and beef stew or pork chops with potatoes for dinner, and often some fruit yogurt or pudding for dessert. With lunch and dinner he usually has one or two glasses of beer. He usually has some low-fat snacks and beer while watching TV at night. You recommend that he:
- a) Reduce his salt intake further

- b) Reduce his potassium intake
 - c) Reduce his calcium intake
 - d) Increase his folate intake
 - e) Drink less beer
- 48.4) A 52-year-old woman comes to see you about her menopausal symptoms. She complains of hot flashes and weight gain. You find that she has developed moderate hypertension over the past 6 months. For the hypertension, you suggest:
- a) Increased activity and weight loss
 - b) Medication
 - c) She wait until full menopause has been reached
 - d) She increase folate intake
 - e) She avoid meat and eggs
- 48.5) A 48-year-old woman who is severely obese (BMI 33) is found to have moderately elevated blood pressure. She wants to know whether medication is unavoidable. You suggest as a potentially effective alternative that she:
- a) Lose 10-15 pounds
 - b) Reduce the ratio of saturated to unsaturated fat in her diet
 - c) Increase her folate intake
 - d) Decrease her calcium intake
 - e) Switch to a low-fat diet
- 48.6) A 67-year-old obese man with a history of mild hypertension has come to you for follow-up. His daughter is after him to lose weight to improve his hypertension. With respect to hypertension, weight loss is:
- a) Effective only when coupled with salt reduction
 - b) Only effective when more than 10% of body weight is lost
 - c) Only effective when ideal body weight is achieved
 - d) One of the most effective methods of lowering blood pressure
 - e) Not as effective as calcium restriction
- 48.7) A 37-year-old woman comes in to see you. You find that her BMI is 29 and she is hypertensive. You find that she is open to changing her lifestyle in order to improve her health, but she is not going to become a health fanatic. Your first recommendation is to:
- a) Replace half her usual intake with fruits and vegetables
 - b) Skip one or two meals per day
 - c) Stop eating starchy foods
 - d) Aim for a 10 pound weight loss over the next 5 weeks
 - e) Avoid high-cholesterol foods
- 48.8) A woman living in Alaska is eating a diet that is high in fish, especially compared to a traditional American diet. This patient's diet is likely to:
- a) Increase inflammation
 - b) Increase thrombosis
 - c) Lower HDL cholesterol
 - d) Decrease platelet aggregation
 - e) Reduce of a high fish diet.
- 48.9) A high school student comes in to your office and is doing a science fair project on the effects of a high fish diet. He is willing to eat two servings a day of tuna and salmon.

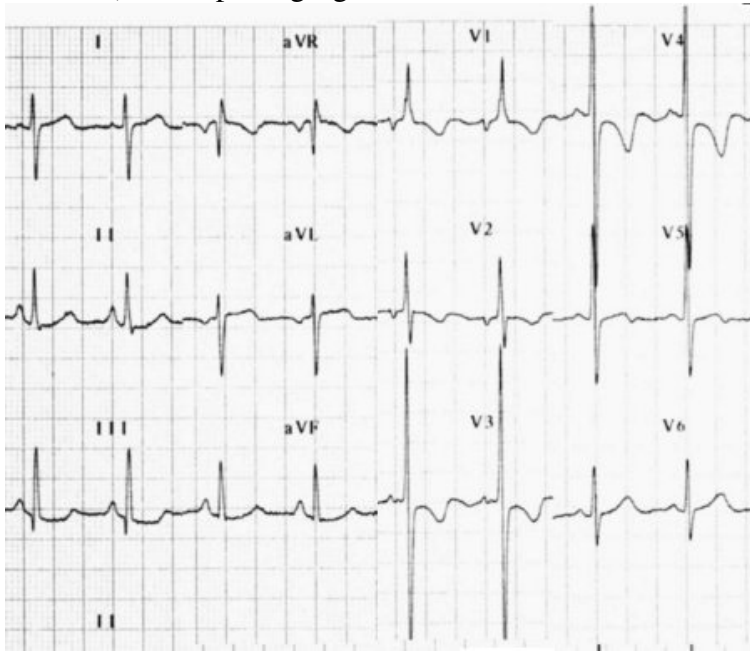
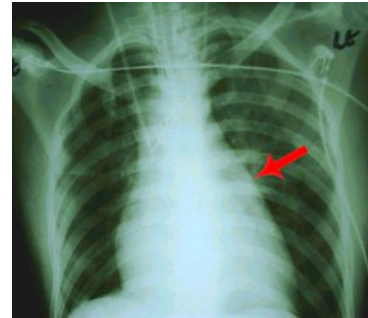
He wants to know if there are any lab tests you can do that will substantiate the effects. You tell him he would probably see a difference within a week if he were to test for:

- a) Blood vessel calcification
 - b) Diminishing of fatty streaks
 - c) Arterial narrowing
 - d) Venous dilation
 - e) Platelet aggregation
- 48.10) An 82-year-old retired professor is worried about his angina which he has had for many years. Which dietary change may affect his short-term risk of myocardial infarction?
- a) Eat more cold water fish
 - b) Stop eating eggs
 - c) Become a lacto-ovo vegetarian
 - d) Start drinking red wine
 - e) Drink only skim milk
- 48.11) If a patient receives antibiotics for two weeks and doesn't eat any green vegetables, canola, or soybean oil, she may have trouble with:
- a) Cholesterol balance
 - b) Vessel occlusion by calcium crystals
 - c) Plaque formation
 - d) Generation of fatty streaks and foam cells
 - e) Blood coagulation
- 48.12) A 63-year-old man comes in because he is having problems with blood clots forming in his legs. You put him on Coumadin and tell him not to change his intake of:
- a) Citrus fruits
 - b) Saturated fats
 - c) Green vegetables
 - d) Olive oil
 - e) Blueberries and grapes
- 48.13) You find that a patient has a prolonged bleeding time after she was started on an antibiotic. Which foods might have prevented this side effect of the antibiotic?
- a) Cold water fish
 - b) Beef and pork
 - c) Dairy products and eggs
 - d) Oranges, grapefruit, and tomatoes
 - e) Cooked greens and green vegetables
- 48.14) A 39-year-old patient comes in to see you for an assessment of his heart disease risk. His father has just had a heart attack at age 61. Your patient is not overweight, doesn't smoke, eats a low-fat diet, and gets some exercise. A homocysteine test shows elevated levels. To determine whether he has a nutritional deficiency elevating homocysteine, check serum levels of:
- a) Alpha-tocopherol and ascorbic acid
 - b) Ascorbic acid and vitamin A
 - c) Potassium and calcium
 - d) Folate and vitamins B6 and B12
 - e) Alpha-tocopherol and carotenoids

Cardiology #12 – Pulmonary Hypertension

1) Which of the following is most likely based on the plain-film AP chest radiograph and ECG below?

- a) Systemic hypertension
- b) Pulmonary hypertension
- c) Left-sided pneumothorax
- d) Right-sided pneumothorax
- e) Tricuspid regurgitation and aortic stenosis



2) Disease of the mitral valve and aortic valve would cause which of the following forms of pulmonary hypertension?

- a) Precapillary pulmonary hypertension
- b) Passive pulmonary hypertension
- c) Reactive pulmonary hypertension
- d) All of the above
- e) None of the above

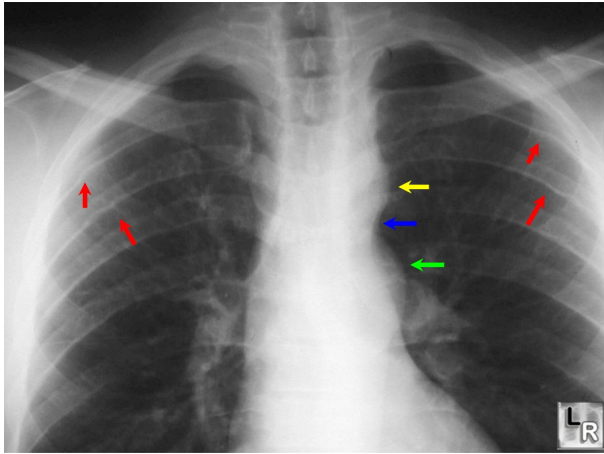
3) A patient presents for a follow-up after being seen for fatigue and vague chest discomfort. At this visit, the patient has dyspnea. An ECG and echocardiogram are done and the patient is diagnosed with mild pulmonary hypertension. Which of the following is NOT a correct treatment option at this time?

- a) Warfarin to achieve an INR of 1.5 to 2
- b) Calcium channel blockers
- c) Prostaglandin (epoprostenol) treatment
- d) Endothelin receptor antagonist treatment
- e) Single- or double-lung transplant

Cardiology #13 – Congenital Heart Disease in Adults

1) What is the most common cardiac anomaly to coexist with coarctation of the aorta?

- a) Atrial septal defect

- b) Ventricular septal defect
 - c) Tetralogy of Fallot
 - d) Bicuspid aortic valve
 - e) Hypoplastic left heart syndrome
- 2) Which of the following is the most common form of atrial septal defect and is associated with acquired mitral stenosis (Lutembacher syndrome)?
- a) Ostium primum
 - b) Ostium secundum
 - c) Sinus venosus
- 3) What is the auscultatory hallmark an atrial septal defect?
- a) S2 split during inspiration
 - b) S2 split during expiration
 - c) S2 fixed split
 - d) S1 split during inspiration
 - e) S1 split during expiration
- 4) Which of the following is NOT an abnormality seen in Tetralogy of Fallot (ToF)?
- a) Atrial septal defect
 - b) Over-riding aorta
 - c) Right ventricular hypertrophy
 - d) RV outflow tract obstruction
 - e) Ventricular septal defect
- 5) Which of the following is most likely based on this radiograph showing a “Figure 3 sign” (yellow, blue, green)?
- a) Tetralogy of Fallot
 - b) Atrial septal defect
 - c) Pulmonary “bat-wing” edema
 - d) Coarctation of the aorta
 - e) Pulmonary hypertension
- 
- 6) A young child presents with cyanosis, nail clubbing, and a prominent right ventricular impulse. Auscultation reveals a single S2 sound (A2) with an absent P2. History reveals spells of sudden increased cyanosis followed by syncope. Which of the following is most likely?
- a) Ventricular septal defect
 - b) Atrial septal defect
 - c) Tetralogy of Fallot
 - d) Pulmonary hypertension
 - e) Tetralogy of Fallot
- 7) What is the most common congenital cardiac malformation encountered in adult populations?
- a) Atrial septal defect
 - b) Ventricular septal defect
 - c) Tetralogy of Fallot
 - d) Bicuspid aortic valve
 - e) Hypoplastic left heart syndrome

8) A 32-year-old man presents with exercise intolerance, cyanosis, heart failure, and hemoptysis. Echocardiography shows a ventricular septal defect with mixing of ventricular blood (Eisenmenger Syndrome). Which of the following is NOT a treatment option for this patient?

- a) Pulmonary vasodilator medications
- b) Anticoagulants
- c) Iron replacement therapy
- d) Therapeutic phlebotomy
- e) Surgical repair

Cardiology #14 – Cardiovascular Microbiology & Immunology

1) A patient is found to have an elevated strep antibody titer after a recent infection with Group A Streptococcus. Using the modified Jones criteria, which of the following would clinch a diagnosis of rheumatic fever?

- a) Carditis and fever
- b) Polyarthrititis and C-reactive protein
- c) Chorea and prolonged PR interval
- d) Erythema marginatum and subcutaneous nodules
- e) Carditis and arthralgia

2) Which of the following major manifestations of acute rheumatic fever is the only one that can cause significant permanent organ damage or death?

- a) Carditis: new cardiac murmurs, cardiomegaly, pericarditis, CHF
- b) Polyarthrititis: larger joints, pattern of migration
- c) Chorea: rapid, purposeless, involuntary movements, emotional lability
- d) Erythema marginatum: nonpainful macule extending outward, serpiginous
- e) Subcutaneous nodules: firm painless lesions, extensor surfaces of elbows/knees

3) What is the currently favored theory for the pathogenesis of acute rheumatic fever?

- a) Capsule of bacteria causes inflammatory cell damage
- b) Release of toxins by bacteria causing cell damage
- c) Bacterial colonization causing cell ischemia and damage
- d) Bacteria causes inhibition of immune response
- e) Autoimmune response causing cell damage

4) Which of the following lab tests used in suspected rheumatic fever is the least diagnostic, but helpful in monitoring disease activity?

- a) Antistreptolysin O titre
- b) Anti-DNase B
- c) Antihyaluronidase
- d) Antistreptokinase
- e) Erythrocyte sedimentation rate

5) A patient is diagnosed with rheumatoid fever with carditis, but no residual heart disease. Which of the following describes the duration of intramuscular benzathine penicillin G treatment?

- a) Three doses over a year period
- b) For five years or until age 21
- c) For ten years or well into adulthood
- d) For at least ten years since the last episode and at least until age 40

- e) For the rest of the patient's life
- 6) Which of the following describes Aschoff-Geipel nodules, the pathognomonic cardiac histological finding associated with rheumatoid fever?
- a) Eosinophilic, sharply outlined inclusion bodies in nerve cells
 - b) Eosinophilic, dense core surrounded by a halo in nerve cells
 - c) Basophilic, central fibrinoid area, elongated nuclei, distinct chromatin pattern
 - d) Thin, red-violet staining, threadlike strands in the shape of a loop or figure-8
 - e) Basophilic, nuclear remnants (clusters of DNA) in circulating erythrocytes
- 7) What is the most important consequence (sequelae) of rheumatic fever?
- a) Life-long antibiotic therapy
 - b) Chronic valvular deformities
 - c) Chronic obstructive pulmonary disease
 - d) Severe joint disease and exercise intolerance
 - e) Increased risk for streptococcal infections throughout life
- 8.1) Which of the following is the most common organism seen in native valve endocarditis (NVE)?
- a) *S. epidermidis* and *S. saprophyticus*
 - b) *S. aureus*
 - c) *Enterococci*
 - d) *Viridans streptococci*
 - e) Fungi and diphtheroids
- 8.2) Which of the following is the most common organism seen in endocarditis with intravenous drug users (IVDU)?
- a) *S. epidermidis* and *S. saprophyticus*
 - b) *S. aureus*
 - c) *Enterococci*
 - d) *Viridans streptococci* (*S. mitor*, *S. bovis*)
 - e) Fungi and diphtheroids
- 8.3) Which of the following is the most common organism seen in early (<2 months post-op) prosthetic valve endocarditis?
- a) *S. epidermidis* and *S. saprophyticus*
 - b) *S. aureus*
 - c) *Enterococci*
 - d) *Viridans streptococci* (*S. mitor*, *S. bovis*)
 - e) Fungi and diphtheroids
- 8.4) Which of the following is the most common organism seen in late (>12 months post-op) prosthetic valve endocarditis?
- a) *S. epidermidis* and *S. saprophyticus*
 - b) *S. aureus*
 - c) *Enterococci*
 - d) *Viridans streptococci* (*S. mitor*, *S. bovis*)
 - e) Fungi and diphtheroids
- 8.5) Which of the following is the most common gram-negative cause of endocarditis, which is almost exclusively IV drug users?
- a) *M. catarrhalis*
 - b) *E. coli*

- c) *P. aeruginosa*
 - d) *S. enterica*
 - e) *K. pneumoniae*
- 9) HACEK organisms are a set of slow-growing bacteria that are a frequent cause of endocarditis in children. Which of the following HACEK organisms is gram-positive?
- a) *Haemophilus aphrophilus*
 - b) *Actinobacillus actinomycetemcomitans*
 - c) *Cardiobacterium hominis*
 - d) *Eikenella corrodens*
 - e) *Kingella kingae*
 - f) All of the above
 - g) None of the above
- 10) Which of the following components of the pathogenesis (“pathbiology”) of infective endocarditis would be a result of a distant infection of the gingival that migrated after a dentist appointment?
- a) Damage to the endocardial surface
 - b) Aggregation of platelets and fibrin at site of damage
 - c) Transient bacteremia resulting in seeding of the vegetation
 - d) Microbial proliferation on and invasion of the endocardial surface
 - e) Creation of sterile vegetation
- 11) A patient presents with fatigue, malaise, low back pain, and a widened pulse pressure. Which of the following clinical manifestations of infective endocarditis would be seen on ophthalmologic exam?
- a) Petchiae
 - b) Osler nodes
 - c) Janeway lesions
 - d) Splinter hemorrhages
 - e) Roth spots
- 12) Which of the following is true regarding the role of blood cultures in the diagnosis of infective endocarditis?
- a) Prior antibiotic administration will not affect diagnostic results
 - b) Three sets of blood cultures should be drawn at least an hour apart
 - c) Duke criteria is diagnostic if one major criteria is found
 - d) Duke criteria is diagnostic if one major and two minor criteria are found
 - e) Duke criteria is diagnostic if four minor criteria are found
- 13) Nosocomial native valve endocarditis is most frequently associated with which of the following?
- a) Prosthetic valve surgery
 - b) Indwelling vascular catheters
 - c) Foley urinary catheters
 - d) Re-used gurney linens
 - e) Monitoring equipment (e.g. BP cuffs)
- 14) A cancer patient presents with a new onset murmur. Testing suggests the patient has non-bacterial thrombotic endocarditis (NBTE, marantic endocarditis). Which valve is most likely to be affected?
- a) Aortic

- b) Mitral
 - c) Pulmonary
 - d) Tricuspid
- 15) Libman-Sacks endocarditis is usually associated with which of the following diseases?
- a) Systemic lupus erythematosus
 - b) Diabetes mellitus
 - c) Diabetes insipidus
 - d) Paget disease
 - e) Peyronie disease
- 16) A child is diagnosed with myocarditis during the “flu” season. Which of the following is the most likely cause?
- a) Orthomyxoviruses (Influenza)
 - b) Paramyxoviruses (Measles)
 - c) Togaviruses (Rubella)
 - d) Coxsackie B viruses
 - e) Coxsackie A viruses
- 17) What is the pathogenesis that is thought to be involved in the common form of myocarditis?
- a) Damage caused by bacterial toxin
 - b) Damage caused by parasite in the blood
 - c) Damage caused by direct infection and cytolysis
 - d) Damage caused by bacterial replication and cytolysis
 - e) Damage caused by immune response to bacteria
- 18) Which of the following is the gold standard for diagnosis of myocarditis?
- a) Indium 111-labeled antimyosin antibody imaging
 - b) CK-MB elevation
 - c) Nonspecific ST-segment and T-wave abnormalities
 - d) Isolation of virus in stool
 - e) Endocardial biopsy
- 19) What is the causative agent of Chagas disease?
- a) *Giardia lamblia*
 - b) *Babesia microfti*
 - c) *Trypanosoma cruzi*
 - d) *Borrelia burgdorferi*
 - e) *Plasmodium falciparum*
- 20) What is the method of acquisition of Chagas disease?
- a) Kissing bug (reduviid)
 - b) Fecal-oral cysts (unclean water)
 - c) Ticks or white-footed mice
 - d) Mosquito (sporozoites)
 - e) Parrots or flying squirrels
- 21) What population is at an increased risk for Chagas disease?
- a) North America and Canada
 - b) Sub-Saharan Africa
 - c) Tropical Rainforest

- d) Central and South America
 - e) Eastern Asia
- 22) Which of the following is a common clinical manifestation of chronic Chagas disease?
- a) ST elevation in leads V1, V2, and V3
 - b) Endocarditis with splinter hemorrhages
 - c) Hypertension with AV nicking and cotton-wool spots
 - d) Myocarditis with enlarged, flabby heart
 - e) Pulmonary hypertension with “butterfly-wing” effusions
- 23) Which of the following describes xenodiagnosis in Chagas disease?
- a) Allowing infected insects to bite the patient and then examining the patient’s stool and blood for infection
 - b) Allowing infected insects to bite the patient and then examining the insects for infection
 - c) Allowing non-infected (clean) insects to bite the patient and then examining the patient’s stool and blood for infection
 - d) Allowing non-infected (clean) insects to bite the patient and then examining the insects for infection
 - e) Injecting the patient’s blood into a test animal of similar blood type and then monitoring the animal for symptoms or death
- 24) Which of the following is used in the treatment of acute phase Chagas disease?
- a) Penicillin and erythromycin
 - b) Nifurtimox and benznidazole
 - c) Trimethoprim and sulfamethoxazole (TMP-SMX)
 - d) Moxifloxacin or levofloxacin
 - e) There is no treatment as Chagas disease is irreversible
- 25.1) Which of the following is a systemic response to infection and may be defined as systemic inflammatory response syndrome (SIRS)?
- a) Infection
 - b) Bacteremia
 - c) Severe sepsis
 - d) Sepsis
 - e) Septic shock
- 25.2) Which of the following involves hypotension (BP < 90mmHg, MAP < 70mmHg) despite fluid resuscitation?
- a) Infection
 - b) Bacteremia
 - c) Severe sepsis
 - d) Sepsis
 - e) Septic shock
- 26) What is the most common virulence factor involved in gram-negative sepsis, leading to clotting, fever, and inflammation?
- a) Inflammatory response
 - b) cAMP inducing toxin
 - c) Toxin inhibits protein synthesis
 - d) LPS endotoxin

- e) Superantigen
- 27) Which of the following is the most potent mediator of the pathophysiology of gram-negative sepsis syndrome (fever, tachycardia, hypotension, acidosis)?
- a) Tumor necrosis factor alpha (TNF- α)
 - b) Tumor necrosis factor beta (TNF- β)
 - c) Interferon gamma (IFN- γ)
 - d) Interleukin 2 (IL-2)
 - e) Interleukin 4 (IL-4)
- 28) What of the following virulence factors is NOT responsible for septic shock seen in gram-positive infections?
- a) Peptidoglycan
 - b) Lipoteichoic acid (LTA)
 - c) Superantigens
 - d) Lipopolysaccharide (LPS)
- 29) Which of the following gram-positive bacteria associated with sepsis is common and has a high pathogenicity?
- a) *Staphylococcus epidermidis*
 - b) *Enterococcus faecalis*
 - c) *Viridans streptococci*
 - d) *Staphylococcus aureus*
 - e) *Clostridium perfringens*

Cardiology #15 – Valvular Heart Disease

- 1) A patient presents with hypertension and angina. Echocardiography reveals increased left ventricular pressure and heaped-up calcified masses behind the tricuspid aortic valve. What is the most likely age of this patient?
- a) Infant to 10 years old
 - b) 30 to 50 years old
 - c) 50 to 70 years old
 - d) 70 to 90 years old
 - e) Older than 85 years old
- 2) A patient presents with hypertension and angina. Echocardiography reveals an aortic valve with an incomplete midline commissure (raphe) with calcified deposits and atrial dilation. What is the most likely age of this patient?
- a) Infant-10 years old
 - b) 50-60 years old
 - c) 60-70 years old
 - d) 70-80 years old
 - e) 80-90 years old
- 3) A 65-year-old female presents with systemic hypertension and aortic stenosis. Calcific heart disease is found in one of the atrioventricular valves. Which of the following is most likely?
- a) Mitral valve stenosis (calcification)
 - b) Mitral annular ring calcification
 - c) Tricuspid valve stenosis (calcification)
 - d) Tricuspid annular ring calcification

- e) Myxomatous mitral valve (prolapsed)
- 4) Which of the following is NOT seen in mitral valve prolapse?
- a) Attenuation of the fibrous layer of the valve
 - b) Thickening of the spongiosa layer with deposition of mucoid material
 - c) Presence of a mid-diastolic click
 - d) Annular insufficiency of the valve
 - e) Intercardial hooding (ballooning) of the valve leaflets
- 5) Which of the following is NOT a classic symptom of aortic stenosis?
- a) Swelling of the feet or ankles
 - b) Orthopnea and dry cough
 - c) Weight loss
 - d) Paroxysmal nocturnal dyspnea
 - e) Decreased appetite and muscle strength
- 6) Of all patients presenting with aortic stenosis, 50% of those with angina will die in 5 years, 50% of those with syncope will die in 3 years, and 50% of those with CHF will die in 2 years. Overall, 25% of symptomatic patients with aortic stenosis will die in:
- a) 1 year
 - b) 2 years
 - c) 3 years
 - d) 4 years
 - e) 5 years
- 7) An 84-year-old female presents with dyspnea, angina, and weight-gain. Auscultation and echocardiography reveal aortic stenosis. The clinician determines the patient is inoperable due to the risk of aortic valve replacement. Which of the following is the effective, definitive treatment for this patient?
- a) Undergoing the effective surgery
 - b) ACE inhibitors and beta-blockers
 - c) Thiazide diuretics and NSAIDs
 - d) Opioid pain relievers and aspirin therapy
 - e) No effective definitive treatment exists
- 8) What is the most common cause of acquired mitral stenosis?
- a) Peripheral hypertension
 - b) Aortic stenosis
 - c) Rheumatic heart disease
 - d) Cor pulmonale
 - e) Mitral annular stenosis
- 9) Which of the following individuals is most likely to develop mitral stenosis based on prevalence?
- a) 12-year-old male
 - b) 8-year-old female
 - c) 55-year-old male
 - d) 45-year-old female
 - e) 85-year-old male
- 10.1) Hemoptysis, dysphagia, and hoarseness (recurrent laryngeal nerve) are associated with enlargement of what cardiac chamber?
- a) Left atrium

- b) Left ventricle
 - c) Right atrium
 - d) Right ventricle
- 10.2) Which of the following auscultatory findings of mitral stenosis is NOT correct?
- a) Loud S1
 - b) Parasternal lift
 - c) S2 followed by opening snap
 - d) Aortic component of S2 is loudest
 - e) Opening snap followed by early diastolic rumble
- 11) What is the most common cause of mitral regurgitation in the United States?
- a) Myocardial ischemia
 - b) Mitral valve prolapse
 - c) Papillary muscle dysfunction
 - d) Acute myocardial infarction
 - e) Severed chordae tendinae
- 12) Which of the following would result in an apical holosystolic murmur that radiates toward the axilla?
- a) Aortic stenosis (AS)
 - b) Aortic insufficiency (AI)
 - c) Mitral stenosis (MS)
 - d) Mitral regurgitation (MR)
 - e) Mitral valve prolapse (MVP)
- 13) Which of the following would result in a midsystolic click and late systolic murmur?
- a) Aortic stenosis (AS)
 - b) Aortic insufficiency (AI)
 - c) Mitral stenosis (MS)
 - d) Mitral regurgitation (MR)
 - e) Mitral valve prolapse (MVP)
- 14) Which of the following causes of aortic regurgitation affects the aortic leaflets, rather than the aortic root?
- a) Marfan syndrome
 - b) Anorexigenic drugs
 - c) Syphilis
 - d) Ankylosing spondylitis
 - e) Psoriatic arthritis
- 15) Which of the following is seen in chronic aortic insufficiency?
- a) Widened pulse pressure
 - b) Loud diastolic murmur
 - c) Peripheral arterial signs
 - d) Vasoconstriction and high vascular resistance
 - e) Elevated LV end-diastolic pressure

Cardiology #16 – Diseases of the Myocardium

- 1.1) Which of the following usually presents with an increased ejection fraction (>60%)?
- a) Dilated cardiomyopathy (DCM)
 - b) Restrictive cardiomyopathy (RCM)

- c) Hypertrophic cardiomyopathy (HCM)
- 1.2) Which of the following presents with systolic failure and is the most commonly seen?
- a) Dilated cardiomyopathy (DCM)
 - b) Restrictive cardiomyopathy (RCM)
 - c) Hypertrophic cardiomyopathy (HCM)
- 2) What is the most common electrocardiographic (ECG) finding seen in cardiac amyloidosis with increased ventricular wall thickness seen on echocardiography?
- a) LVH due to increased voltage in V4, V5, V6
 - b) RVH due to increased voltage in V1, V2, V3
 - c) Increased PR interval and QRS duration
 - d) Increased QT interval
 - e) Decreased voltage in all leads
- 3) Which of the following would accentuate a systolic ejection murmur seen in patients with hypertrophic obstructive cardiomyopathy (HOCM)?
- a) Squatting from standing
 - b) Valsalva maneuver
 - c) 30s maximal handgrip
 - d) Giving a vasopressor
 - e) Müller maneuver
- 4) What type of cardiomyopathy is most likely to cause sudden death in athletes?
- a) Dilated cardiomyopathy (DCM)
 - b) Restrictive cardiomyopathy (RCM)
 - c) Hypertrophic cardiomyopathy (HCM)
- 5) A patient presents with symptoms of cardiac ischemia. A biopsy is taken and deposits are highlighted by classic apple-green birefringence on Congo red stain as well as a sulfated Alcian blue stain. Which of the following is most likely?
- a) Dilated cardiomyopathy
 - b) Systemic hemochromatosis
 - c) Hypertrophic cardiomyopathy
 - d) Cardiac amyloidosis
 - e) Rheumatic heart disease
- 6) A patient with severe systolic dysfunction undergoes a cardiac biopsy. The myocytes shows deposits on Prussian blue stain abundant siderosomes. Which of the following is most likely?
- a) Dilated cardiomyopathy
 - b) Systemic hemochromatosis
 - c) Hypertrophic cardiomyopathy
 - d) Cardiac amyloidosis
 - e) Rheumatic heart disease

Cardiology #17 – Cardiac Tumors, Trauma, & Systemic Disease

- 1) What is the most common primary cardiac tumor in adults?
- a) Pericardial cysts
 - b) Rhabdomyoma
 - c) Fibroma

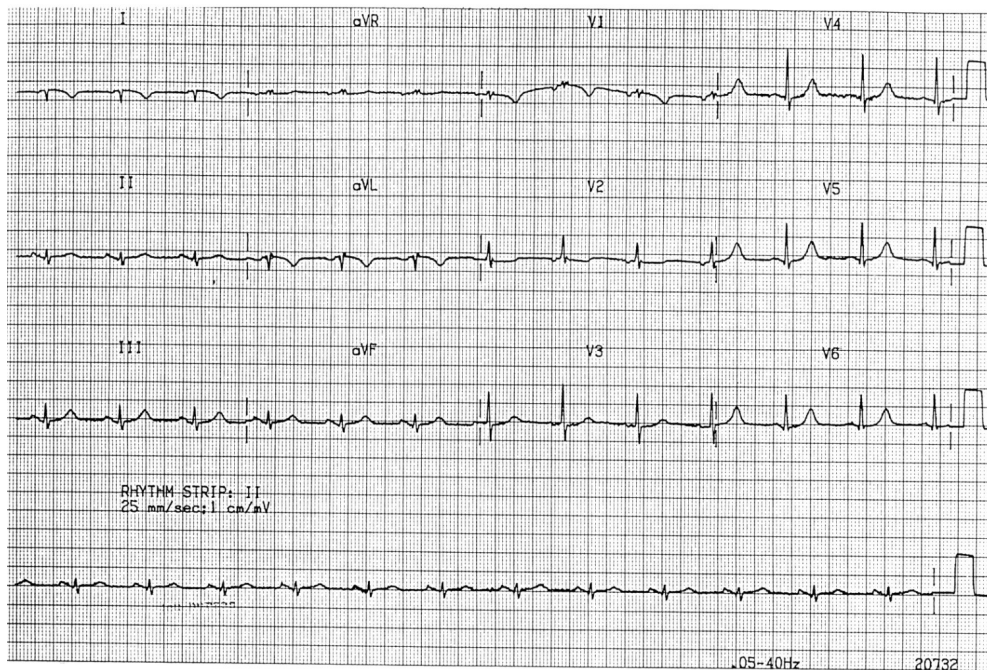
- d) Myxoma
 - e) Teratomas of the pericardium
- 2) Along with lymphoma and sarcoma, which of the following primary cardiac tumors is malignant?
- a) Myxoma
 - b) Rhabdomyoma
 - c) Mesothelioma
 - d) Lipoma
 - e) Fibroma
- 3) A 45-year-old woman presents with fever and malaise. After auscultation the clinician is suspicious of rheumatic heart disease. However, echocardiography reveals a myxoma. Which of the following best describes how the tumor could simulate rheumatic disease?
- a) Left atrial myxoma plops over and obstructs mitral valve during diastole
 - b) Right myxoma plops over and obstructs tricuspid valve during diastole
 - c) Left ventricular myxoma obstructs aortic valve outflow during systole
 - d) Right ventricular myxoma obstructs pulmonic valve outflow during systole
- 4) A patient presents with intermittent flushing of the skin, cramps, nausea, vomiting, and diarrhea. Auscultation reveals isolated tricuspid stenosis. The clinician suspects carcinoid tumors, which are endocrine in nature. Thus, the clinician asks for a urine sample to test for metabolites of which of the following, which correlates to the severity of right heart lesions?
- a) Histamine
 - b) Serotonin
 - c) Prostaglandins
 - d) Dopamine
 - e) Epinephrine
- 5) What is the most common finding in heart disease of rheumatoid arthritis?
- a) Mitral valve stenosis
 - b) Mitral valve insufficiency
 - c) Aortic root stenosis
 - d) Aortic valve cusp thickening
 - e) Fibrous pericarditis

Cardiology #18 – Diseases of the Pericardium

- 1) The parietal layer of the pericardium adheres to the heart.
- a) True
 - b) False, the visceral layer adheres to the heart
- 2) Which of the following is NOT a function of the pericardium?
- a) Prevents spread of infection
 - b) Cools the heart during pumping work
 - c) Prevents extreme dilation of the heart
 - d) Limits motion of the heart
- 3) Which of the following is NOT often associated with pulsus paradoxus being increased > 10mmHg, with a slight shift in the intraventricular septum to the left?
- a) COPD
 - b) Hypovolemic shock

- c) Constrictive pericarditis
 - d) Pericardial tamponade
 - e) Bronchospasm
- 4) Which of the following is the most common cause of acute pericarditis?
- a) Tuberculosis
 - b) Pyogenic bacteria
 - c) Drug-induced (Procainamide, hydralazine, methyldopa, isoniazide, phenytoin)
 - d) Dressler syndrome
 - e) Virus
- 5) Which of the following is NOT a complication seen with acute pericarditis?
- a) Constrictive pericarditis
 - b) Pericardial effusion
 - c) Pericardial tamponade
 - d) Aortic aneurysm

6.1) A patient presents with chest discomfort, dyspnea, and fatigue. Their ECG is shown here (note lead I and aVR). Which of the following is most likely?



- a) Acute pericarditis
 - b) Pericardial effusion
 - c) Pericardial tamponade
 - d) Constrictive pericarditis
- 6.2) A patient presents with an early diastolic “knock” at the LSB, suggesting ventricular filling has become impaired at mid to late diastole. Physical exam reveals edema of the ankles. Blood work is positive for tuberculosis. Which of the following is most likely?
- a) Acute pericarditis
 - b) Pericardial effusion
 - c) Pericardial tamponade
 - d) Constrictive pericarditis

6.3) A patient presents with chest discomfort. An ECG reveals PR segment depression in the same leads that have ST segment elevation. PR elevation and ST depression are seen in lead aVR. Auscultation reveals a friction rub and “scratchy” sound at the LSB. Chest x-ray is normal. CBC shows mild leukocytosis. Which of the following is most likely?

- a) Acute pericarditis
- b) Pericardial effusion
- c) Pericardial tamponade
- d) Constrictive pericarditis

6.4) Which of the following is the most useful in diagnosis pericardial effusion as well as pericardial tamponade?

- a) ECG, EKG
- b) Echocardiography
- c) Chest radiograph
- d) Clinical history and physical exam

7.1) What part of the jugular venous waveform would be blunted in a patient with pericardial tamponade, given that the diastolic pressure in each chamber is equal?

- a) a-wave
- b) c-wave
- c) v-wave
- d) x-descent
- e) y-descent

7.2) How much fluid is normally in the pericardial space?

- a) 1-5cc
- b) 5-10cc
- c) 15-50cc
- d) 35-150cc

7.3) Which of the following describes the jugular venous waveform in a patient with constrictive pericarditis, given that the diastolic pressure in each chamber is equal?

- a) Blunted x-descent
- b) Prominent x-descent
- c) Blunted y-descent
- d) Prominent y-descent

8.1) A patient presents with distant heart sounds (muffled), decreased blood pressure (hypotension), and distention of the jugular veins (JVD). Which of the following is most likely associated with this presentation (Beck triad)?

- a) Acute pericarditis
- b) Pericardial effusion
- c) Pericardial tamponade
- d) Constrictive pericarditis

8.2) A patient presents with dullness to percussion over the angle of the left scapula due to compression of the left lung (Ewart sign). Muffled heart sounds are also heard. Which of the following is most likely?

- a) Acute pericarditis
- b) Pericardial effusion
- c) Pericardial tamponade
- d) Constrictive pericarditis

- 8.3) Which of the following is associated with a pericardial “knock” and increased jugular venous pressure during inspiration (Kussmaul sign)?
- a) Acute pericarditis
 - b) Pericardial effusion
 - c) Pericardial tamponade
 - d) Constrictive pericarditis
- 9.1) What is the definitive treatment for cardiac tamponade (pericardial tamponade)?
- a) Oral corticosteroids and colchicine
 - b) Pericardiocentesis
 - c) Pericardiectomy
 - d) Diuretics and salt restriction
 - e) Beta-blockers and ACE inhibitors
- 9.2) A chest radiograph shows globular, symmetric enlargement of cardiac silhouette in moderate to large effusions (water bottle heart). The underlying cause is unknown. What is the recommended treatment for this patient?
- a) Oral corticosteroids and colchicine
 - b) Pericardiocentesis
 - c) Pericardiectomy
 - d) Diuretics and salt restriction
 - e) Beta-blockers and ACE inhibitors
- 9.3) What is the treatment of choice for acute pericarditis?
- a) Oral corticosteroids and colchicine
 - b) Pericardiocentesis
 - c) Pericardiectomy
 - d) Diuretics and salt restriction
 - e) Beta-blockers and ACE inhibitors
- 9.4) What is the symptomatic (initial) treatment for constrictive pericarditis?
- a) Oral corticosteroids and colchicine
 - b) Pericardiocentesis
 - c) Pericardiectomy
 - d) Diuretics and salt restriction
 - e) Beta-blockers and ACE inhibitors

Cardiology #19 – Diseases of the Aorta

- 1.1) What type of aneurysm is likely seen at an anastomotic junction between a vascular graft and the natural artery?
- a) True aneurysm
 - b) False aneurysm
 - c) Mycotic aneurysm
 - d) Saccular aneurysm
 - e) Fusiform aneurysm
- 1.2) What type of aneurysm is often partially or completely filled with thrombi?
- a) True aneurysm
 - b) False aneurysm
 - c) Mycotic aneurysm
 - d) Saccular aneurysm

- e) Fusiform aneurysm
- 2) A 50-year-old man with hypertension and recent Salmonella gastroenteritis presents with a pulsating abdominal mass. Which of the following is most likely?
- a) Renal tumor
 - b) Crohn disease
 - c) Aneurysm (AAA)
 - d) Abdominal carcinomatosis
 - e) Omental metastasis
- 3) What is the favored location of superimposed atheromatosis seen in leptic (syphilitic) aortic aneurysms?
- a) Below the renal arteries
 - b) At the iliac artery bifurcation
 - c) On the left renal artery
 - d) At the aortic arch, T5 level
 - e) At the aortic root
- 4) A 50-year-old man with poorly controlled hypertension presents with severe, tearing pain in the center of his chest that radiates to his back. The patient says the onset was immediate as he was mowing his lawn. Which of the following is most likely?
- a) Leptic aortic aneurysm
 - b) Abdominal aortic aneurysm (AAA)
 - c) Dissecting aortic aneurysms
 - d) Aneurysm of sinus of Valsalva
 - e) Ehlers-Danlos Syndrome
- 5) Which of the following could lead to degradation of elastin and collagen within the tunica media of the aortic wall, predisposing the patient to an aortic dissection?
- a) Marfan syndrome
 - b) Lambert-Eaton syndrome
 - c) Reiter syndrome
 - d) Sjögren syndrome
 - e) Adams-Stokes syndrome
- 6) Which of the following is the most practical means of screening for and abdominal aortic aneurysm (AAA)?
- a) Computed tomography (CT)
 - b) Magnetic resonance imaging (MRI)
 - c) Chest radiograph (x-ray)
 - d) Ultrasound
 - e) ECG, EKG
- 7) Which of the following is the preferred modality for following serial changes in abdominal aortic aneurysm (AAA) size over time?
- a) Computed tomography (CT)
 - b) Magnetic resonance imaging (MRI)
 - c) Chest radiograph (x-ray)
 - d) Ultrasound
 - e) ECG, EKG
- 8) Which of the following would be used as the mainstay medical therapy for aortic aneurysms as well as aortic dissection?

- a) Open-heart surgery
- b) IV labetalol
- c) IV amiodarone
- d) IV dopamine
- e) IV mannitol

Cardiology #20 – Extra: Evaluation and Management of Acute Low Back Pain

- 1) Low-back pain affects 90% of the population as some point in their lives and is the ____ cause of symptom-related visits to primary care physicians.
- a) Primary
 - b) Second
 - c) Third
 - d) Fourth
 - e) Fifth
- 2) Low-back pain is the primary cause of work-related disability in person under age 45 and in a majority of cases (84%) the clear cause is:
- a) Nerve impingement
 - b) Herniated disk
 - c) Spondylolisthesis
 - d) Spondylitis
 - e) Unknown
- 3) Chronic low back pain is defined as pain lasting longer than:
- a) 3 weeks
 - b) 6 weeks
 - c) 9 weeks
 - d) 12 weeks
 - e) 15 weeks
- 4) What age groups are at high risk (“red flags”) for serious etiology with low back pain?
- a) Patients younger than 18 or older than 50
 - b) Patients younger than 5 or older than 50
 - c) Patients younger than 18 or older than 65
 - d) Patients younger than 5 or older than 65
 - e) Patients younger than 1 or older than 70
- 5) Approximately 80% of patients with low back pain will be symptom-free after how many weeks?
- a) 3 weeks
 - b) 6 weeks
 - c) 9 weeks
 - d) 12 weeks
 - e) 15 weeks
- 6) Approximately 95% of all herniated disks occur at what levels?
- a) L1-L2 and L2-L3
 - b) L2-L3 and L3-L4
 - c) L3-L4 and L4-L5
 - d) L4-L5 and L5-S1
 - e) L5-S1 and S1-S2

- 7) An elderly patient presents with low back pain after minor trauma. Which of the following medications would be a “red flag” for possible serious low back etiology?
- a) Long term use of beta-blockers
 - b) Long term use of anti-hypertensives
 - c) Long term use of corticosteroids
 - d) Long term use of opiates
 - e) Long term use of anti-gouts
- 8) Which of the following patient groups complaining of low back pain could have an underlying osteomyelitis or epidural abscess?
- a) Elderly taking asthma medications
 - b) Children under age 18
 - c) Weight-lifters
 - d) Obese patients
 - e) Injection drug users
- 9) Which of the following is NOT a “red flag” for serious etiology associated with low back pain?
- a) Discomfort that impedes sleep
 - b) Fever, chills, night sweats
 - c) Pain with Valsalva maneuver
 - d) Saddle anesthesia
 - e) Weight loss
- 10) A female patient presents with severe low back pain and difficulty with urination. The patient is asked for a urine sample but produces very little. A Foley catheter is inserted and a large amount of urine drains. Which of the following is most likely?
- a) Prostate cancer
 - b) Nerve defect
 - c) Muscle damage
 - d) Fused vertebrae
 - e) Spondylolisthesis
- 11) Which of the following types of primary tumors is NOT found in the spinal cord?
- a) Osteosarcoma
 - b) Lymphoma
 - c) Sarcoma
 - d) Neurofibromas
 - e) Multiple myeloma
- 12) A patient presents with a hypo-reflexive Achilles reflex and diminished sensation on the lateral foot. The patient has difficulty with walking on their toes. Which of the following nerves may be damaged?
- a) L3
 - b) L4
 - c) L5
 - d) S1
 - e) S2
- 13) Patients presenting with 3 or more of the 5 Waddell Signs are more likely to have non-organic disease. Which of the following is NOT a Waddell sign for low back pain?
- a) Excessive tenderness

- b) Simulation (loading)
 - c) Distraction
 - d) Skin redness
 - e) Over-reaction
- 14) During a straight leg raise test, the patient lies prone and the clinician raises the leg to 70 degrees. The test can be further verified by lowering 10 degrees below the point of pain and having the patient dorsiflex their foot. Pain in what anatomical location would be a positive test?
- a) Low back
 - b) Hip
 - c) Hamstring
 - d) Kneecap
 - e) Below knee
- 15) Which of the following laboratory tests would NOT be diagnostic for low back pain caused by acute infection or malignancy?
- a) Complete blood count (CBC)
 - b) C-reactive protein (CRP)
 - c) Erythrocyte sedimentation rate (ESR)
 - d) Blood urea nitrogen (BUN)
 - e) Urinalysis
- 16) Which of the following is NOT true regarding routine use of plain film radiography in patients with low back pain?
- a) They often reveal diagnostic information
 - b) They take out unnecessary time from an exam
 - c) They add extra cost for the patient
 - d) They subject the patient to unnecessary radiation
 - e) They are more useful than MRI for nerve deficits
- 17) What activity level is currently accepted as treatment for low back pain?
- a) Seven days of bed rest
 - b) Minimal activity
 - c) Normal, tolerable activity
 - d) Daily activity, even if slightly painful
 - e) An exercise regimen to help strengthen back muscles
- 18) Which of the following could be given to a patient with low back pain in addition to pain medication to prevent gastric ulcer?
- a) Acetaminophen (Tylenol, Paracetamol)
 - b) Misoprostol (Cytotec)
 - c) Ibuprofen (Motrin)
 - d) Naproxen (Aleve)
 - e) Hydrocodone (Lortab)
- 19) Which of the following describes the current role of manipulation in the setting of acute low back pain?
- a) It has been shown to be cost-effective
 - b) It has been shown to significantly reduce recover time
 - c) It has been proven to have lasting benefit
 - d) It has been shown to give some short-term relief

- e) It has been shown to be significantly better than physical therapy as well as an educational booklet for the patient
- 20) About 50% of patients with a herniated disk will recover within what time period?
- a) 3 weeks
 - b) 6 weeks
 - c) 9 weeks
 - d) 12 weeks
 - e) 15 weeks
- 21) If cauda equina syndrome is suspected, what drug should be given?
- a) Dexamethasone after lab test confirmation
 - b) Dexamethasone with suspicion
 - c) Hydrocodone PO
 - d) Acetaminophen PO
 - e) Milrinone IV
- 22) A patient presents with a primary complaint of low back pain. History reveals the pain has lasted for more than three months, is commonly at night, and does not remit with rest or NSAIDs. The patient mentioned they had a recently treated urinary tract infection. MRI reveals brightening of the marrow on T2, brightening of the disk on T2, and darkening of the marrow on T1. Which of the following is most likely?
- a) Sciatica
 - b) Spondylolisthesis
 - c) Osteomyelitis
 - d) Epidural compression syndrome
 - e) Abdominal aortic aneurysm

AnswerKey	3.4) C	3) E	48) E	27) B
Card #1		4) E	49) A	28) C
1) D	Card #3	5) A		29) E
2.1) E	1) E	6) A	Card #8	30) C
2.2) B	2) B	7) D	1) A	31) C
2.3) A	3.1) D	8) C	2) C	32) A
3.1) B	3.2) A	9) C	3) B	33) E
3.2) D	4) C	10) B	4) E	34) B
4.1) A		11) D	5) D	35.1) B
4.2) C	Card #4	12) E	6) D	35.2) E
5.1) C	1) D	13) B		
5.2) C	2) C	14) C	Card #9	Card #10
6.1) A	3) E	15) B	1) E	1) D
6.2) C	4) E	16) C	2) A	2) B
7.1) C	5) A	17) C	3) C	
7.2) D	6) E	18) D	4) E	Card #11
7.3) E	7) E	19) E	5) C	1) D
7.4) B	8) C	20) D	6) D	2) C
8.1) A		21) A	7) A	3) E
8.2) C	Card #5	22) B	8) B	4) D
8.3) C	1) E	23) E	9) C	5) A
8.4) D	2) C	24) D	10) A	6) C
8.5) B	3) B	25) C	11) D	7) B
8.6) C	4) D	26) D	12) D	8) C
8.7) A	5) A	27) B	13) E	9.1) B
8.8) E	6) D	28) E	14) C	9.2) C
9.1) A	7) A	29) C	15) B	9.3) A
9.2) B		30) B	16) A	9.4) D
9.3) E	Card #6	31) D	17) E	9.5) C
9.4) B	1) D	32) C	18) B	9.6) A
9.5) C	2) E	33) B	19) A	9.7) B
9.6) A	3) E	34) D	20) C	9.8) C
9.7) D		35.1) A	21) B	10) D
9.8) C	Card #7	35.2) C	22.1) A	11) E
9.9) D	1.1) C	36) E	22.2) B	12) D
9.10) B	1.2) C	37) C	22.3) D	13) B
9.11) A	2.1) E	38) E	22.4) B	14) D
9.12) E	2.2) F	39) A	23) A	15) C
	2.3) B	40) B	24.1) E	16) E
Card #2	2.4) G	41) D	24.2) C	17) C
1) E	2.5) D	42) E	25.1) A	18) D
2.1) B	2.6) A	43) E	25.2) C	19) B
2.2) D	2.7) E	44) C	26.1) E	20) E
3.1) E	2.8) B	45) C	26.2) A	21) A
3.2) A	2.9) A	46) E	26.3) D	22) E
3.3) E	2.10) C	47) B	26.4) D	23) C

- 24) B
- 25.1) E
- 25.2) C
- 25.3) A
- 25.4) D
- 25.5) B
- 26) C
- 27) C
- 28) A
- 29) B
- 30) E
- 31) A
- 32) B
- 33) B
- 34) D
- 35) A
- 36) D
- 37) B
- 38) A
- 39) C
- 40) A
- 41) B
- 42) B
- 43) D
- 44) C
- 45) D
- 46) C
- 47.1) E
- 47.2) C
- 47.3) B
- 47.4) D
- 47.5) B
- 47.6) E
- 47.7) C
- 48.1) D
- 48.2) C
- 48.3) E
- 48.4) A
- 48.5) A
- 48.6) D
- 48.7) D
- 48.8) D
- 48.9) E
- 48.10) A
- 48.11) E
- 48.12) C

- 48.13) E
- 48.14) D
- Card #12**
- 1) B
- 2) B
- 3) E
- Card #13**
- 1) D
- 2) B
- 3) C
- 4) A
- 5) D
- 6) E
- 7) D
- 8) E
- Card #14**
- 1) D
- 2) A
- 3) E
- 4) E
- 5) C
- 6) C
- 7) B
- 8.1) D
- 8.2) B
- 8.3) A
- 8.4) B
- 8.5) C
- 9) G
- 10) C
- 11) E
- 12) B
- 13) B
- 14) B
- 15) A
- 16) D
- 17) C
- 18) E
- 19) C
- 20) A
- 21) D
- 22) D
- 23) D

- 24) B
- 25.1) D
- 25.2) E
- 26) D
- 27) A
- 28) D
- 29) D
- Card #15**
- 1) D
- 2) B
- 3) B
- 4) C
- 5) C
- 6) C
- 7) E
- 8) C
- 9) D
- 10.1) A
- 10.2) D
- 11) B
- 12) D
- 13) E
- 14) B
- 15) E
- Card #16**
- 1.1) C
- 1.2) A
- 2) E
- 3) B
- 4) C
- 5) D
- 6) B
- Card #17**
- 1) D
- 2) C
- 3) A
- 4) B
- 5) E
- Card #18**
- 1) B
- 2) B
- 3) C

- 4) E
- 5) D
- 6.1) B
- 6.2) D
- 6.3) A
- 6.4) B
- 7.1) E
- 7.2) C
- 7.3) D
- 8.1) C
- 8.2) B
- 8.3) D
- 9.1) B
- 9.2) B
- 9.3) A
- 9.4) D
- Card #19**
- 1.1) B
- 1.2) D
- 2) C
- 3) E
- 4) C
- 5) A
- 6) D
- 7) A
- 8) B
- Card #20**
- 1) B
- 2) E
- 3) D
- 4) A
- 5) B
- 6) D
- 7) C
- 8) E
- 9) A
- 10) B
- 11) C
- 12) D
- 13) D
- 14) E
- 15) D
- 16) A
- 17) C

- 18) B
- 19) D
- 20) B
- 21) B
- 22) C

**Quiz by:
James
Lamberg**

Please let me know if there are any errors and I will fix them. Email James Lamberg: James.Lamberg@gmail.com
If you think these quizzes are a good resource, please help me make them better.