Cardiovascular System

1

EXAM BLUEPRINT TOPICS

Cardiomyopathy
Dilated
Hypertrophic
Restrictive
Conduction Disorders
Atrial fibrillation/flutter
Atrioventricular block
Bundle branch block
Paroxysmal supraventricular tachycardia
Premature beats
Ventricular tachycardia
Ventricular fibrillation/flutter
Congenital Heart Disease
Atrial septal defect
Coarctation of aorta
Patent ductus arteriosus
Tetralogy of Fallot
Ventricular septal defect
Congestive Heart Failure
Hypertension
Essential
Secondary
Malignant
Hypotension
Cardiogenic shock
Orthostatic/postural
Ischemic Heart Disease
Acute myocardial infarction
Angina pectoris

- Stable
- Unstable
- Prinzmetal's variant

Vascular Disease
Acute rheumatic fever
Aortic aneurysm
Aortic dissection
Arterial embolism/thrombosis
Chronic/acute arterial occlusion
Giant cell arteritis
Phlebitis/thrombophlebitis
Venous thrombosis
Varicose veins
Valvular Disease
Aortic stenosis
Aortic insufficiency
Mitral stenosis
Mitral insufficiency
Mitral valve prolapse
Tricuspid insufficiency
Pulmonary stenosis
Other Forms of Heart Disease
Acute/subacute bacterial endocarditis
Acute pericarditis
Cardiac tamponade
Pericardial effusion

CARDIOMYOPATHY

I. Dilated
  a. General
    i. Caused by malfunction of the myocardium.
    ii. Most common cause is alcohol abuse.
      1. Etiology may also be idiopathic, infectious, or drugs.
    iii. Cardiac dilatation leads to right and left systolic dysfunction and then congestive heart failure.
  b. Clinical manifestations
    i. Most common first symptom is exertional intolerance.

NOTES

ii. Other signs and symptoms are same as congestive heart failure.
1. Include dyspnea, orthopnea, and edema in the lower extremities.
2. Chest pain may also be noted.
iii. Physical examination reveals an S_3 on cardiac exam, and crackles are noted on examination of the lungs.
1. Mitral regurgitation may also be noted.
c. Diagnosis
i. On electrocardiogram (EKG), nonspecific ST and T wave changes may be noted along with left bundle branch block (LBBB).
ii. Chest X-ray reveals cardiomegaly and pulmonary vascular congestion.
iii. Echocardiogram reveals dilated chambers, thin left ventricular wall, and poor wall movement.
1. Ejection fraction is decreased, typically less than 30%.
d. Treatment
i. Withdraw offending agents, such as alcohol.
ii. Treatment of the congestive heart failure includes diuretics, possible use of digoxin, and sodium restriction.
1. Angiotensin-converting enzyme (ACE) inhibitors are helpful unless contraindicated.
2. Beta-blockers are indicated in patients with stable heart failure.
iii. Cardiac transplantation may be needed.

II. Hypertrophic
a. General
i. Most common cause of sudden death in young athletes.
1. Due to ventricular tachyarrhythmias.
ii. An autosomal dominant genetic cause seen in most cases.
iii. Pathogenesis
1. Hypertrophy of cardiac septum leads to left ventricular outflow obstruction and impaired diastolic filling.
2. Impaired diastolic filling leads to pulmonary congestion.
b. Clinical manifestations
i. Most patients are asymptomatic.
ii. Most common presenting symptom is dyspnea on exertion.
1. May also note angina and syncope.
iii. Physical examination reveals mitral regurgitation, S_4, and prominent left ventricular impulse.
1. Murmur of mitral regurgitation increases with Valsalva maneuver and decreases with handgrip and leg elevation.
c. Diagnosis
i. Echocardiogram makes diagnosis.
1. Note septal wall thickness and ejection fraction are typically greater than 60%.
ii. EKG reveals left ventricular hypertrophy (LVH).
d. Treatment
i. With presence of symptoms, treatment includes beta-blockers (propranolol) and calcium channel blockers (verapamil).
1. Beta-blockers slow the heart rate and allow increased diastolic filling time.
2. Calcium channel blockers improve ventricular compliance.
ii. Diuretics are used for fluid overload.

III. Restrictive
a. General
i. Often caused by an infiltrative process.
1. Such as amyloidosis, sarcoidosis, and hemochromatosis.
ii. Pathogenesis
1. Myocardium changes lead to diastolic noncompliance with elevated filling pressures.
2. Elevated filling pressures lead to pulmonary congestion.
b. Clinical manifestations
i. Most common first symptom is exertion intolerance and fluid retention.
1. Signs of right side heart failure.
(a) Elevated jugular venous distention (JVD).
ii. On physical examination, a pronounced S_4 is noted along with mitral and tricuspid regurgitation.
c. Diagnosis
i. Echocardiogram reveals an ejection fraction between 25% and 50%; normal left ventricular wall thickness, and increased atrial size.

NOTES

ii. EKG reveals low-voltage QRS complexes and nonspecific ST-T wave changes.
iii. Specific diagnosis made by tissue biopsy.
d. Treatment
i. Treat the underlying cause if possible.
ii. Diuretics used to treat congestive heart failure.

CONDUCTION DISORDERS

I. Atrial fibrillation/flutter
a. Atrial fibrillation
i. General
1. Most common sustained arrhythmia in adults.
2. Increase risk with increasing age.
3. Increased risk of intra-atrial clot formation.
ii. EKG findings
1. Rapid, irregular atrial rate of over 400 beats/minute.
2. Ventricular response is irregularly irregular.
3. Atrial fibrillation waves may be coarse, fine, and difficult to discern.
4. R-R interval is irregular.
5. Ventricular rate varies from 100 to 200 beats/minute.
iii. Treatment
1. Rate control is very important.
(a) Rate control with beta-blockers (esmolol, metoprolol), calcium channel blockers (verapamil, diltiazem), or digoxin.
2. Anticoagulation is vital.
(a) Long-term anticoagulation is needed.
(b) Heparin is used acutely, and warfarin sodium (Coumadin) long-term.
3. Rhythm control
(a) Amiodarone is most effective, but side effects are common.
(b) Cardioversion can be attempted if no sign of atrial clots.
b. Atrial flutter
i. General
1. Causes regular atrial rates from 250 to 400 beats/minute.
2. Symptoms include dizziness, palpitations, chest pain, and dyspnea.
ii. EKG findings
1. Present with a sawtooth pattern of P waves in leads II, III, and aVF.
2. Ventricular response is 2:1 to 4:1.
(a) Ventricular rates are then 75 to 150 beats/minute.
iii. Treatment
1. Cardioversion should be attempted if no contraindications.
2. Acute treatment with beta-blockers (esmolol, metoprolol) and calcium channel blockers (verapamil, diltiazem) to control rate.

QUESTION

Which of the following is a common cause of dilated cardiomyopathy?

A. Iron
B. Alcohol
C. Sarcoidosis
D. Amyloidosis

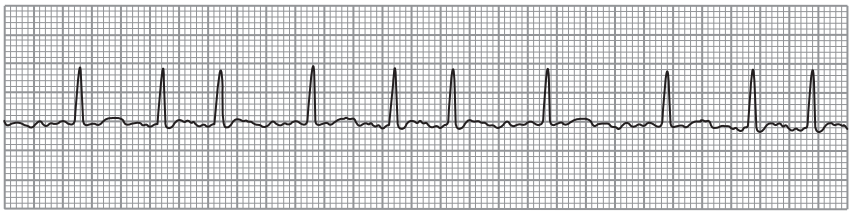

Figure 1-1 Atrial fibrillation.

NOTES

ANSWER B EXPLANATION: *Alcohol is the most common cause of dilated cardiomyopathy. The other options are all causes of restrictive cardiomyopathy.*

correct ❑ **incorrect** ❑

(a) Long-term treatment with amiodarone, sotalol, quinidine, or procainamide.
3. If site of reentrant is known, catheter ablation can be attempted.

c. Multifocal atrial tachycardia
i. General
1. Noted in patients with chronic obstruction pulmonary disease or severe systemic illness.
ii. EKG findings
1. Presence of multiple shaped P waves.
2. Differing PR intervals.
iii. Treatment
1. Treat underlying cause.
2. Calcium channel blockers are agents of choice.

II. Atrioventricular (AV) block
a. General
i. AV block is defined as when some impulses are delayed or do not reach the ventricle.
ii. Syncope may be noted.
b. EKG findings
i. First-degree block
1. Prolonged PR interval
(a) Greater than 0.2 second
ii. Second-degree block
1. General
(a) Some P waves fail to produce a QRS complex.
2. Mobitz type I (Wenckebach)
(a) Have a progressive increase in PR interval, until a P wave is blocked, and the cycle is repeated.
(b) The PR interval after the block is typically the longest.

Figure 1-2 Atrial flutter.

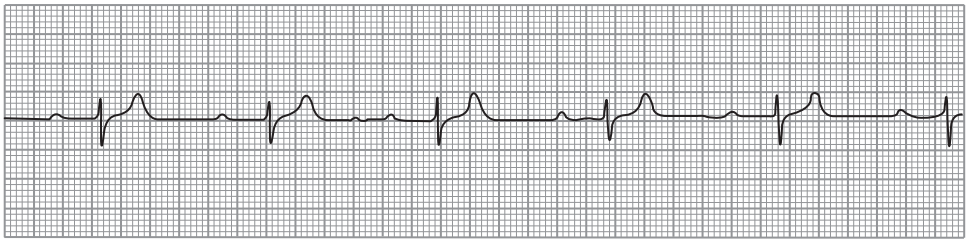

Figure 1-3 First-degree atrioventricular block.

NOTES