



Sick Call Screener Course

Cardiovascular System

(2.3)



Enabling Objectives

- 1.23 Utilize the knowledge of cardiovascular system anatomy while assessing a patient with a cardiovascular complaint
- 1.24 Utilize the knowledge of cardiovascular system physiology while assessing a patient with a cardiovascular complaint
- 1.25 Obtain history from a common cardiovascular disorders patient
- 1.26 Perform a heart and prominent blood vessel examination
- 1.27 State signs and symptoms of common heart disorders
- 1.16 State Red Flag criteria



Introduction

- The heart contributes to homeostasis
- Blood is pumped continuously



Anatomical Landmarks

- Location of the heart
 - Anatomical region

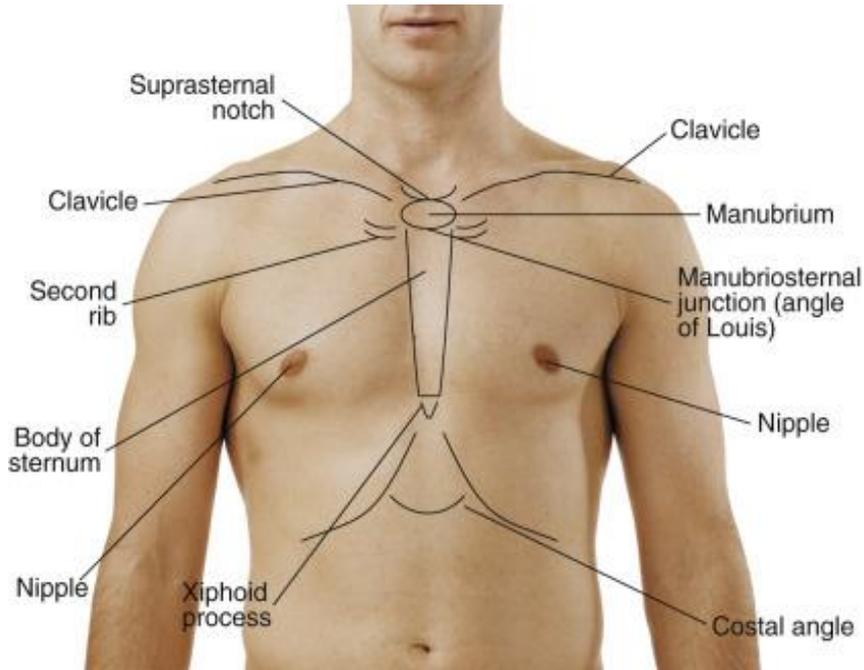
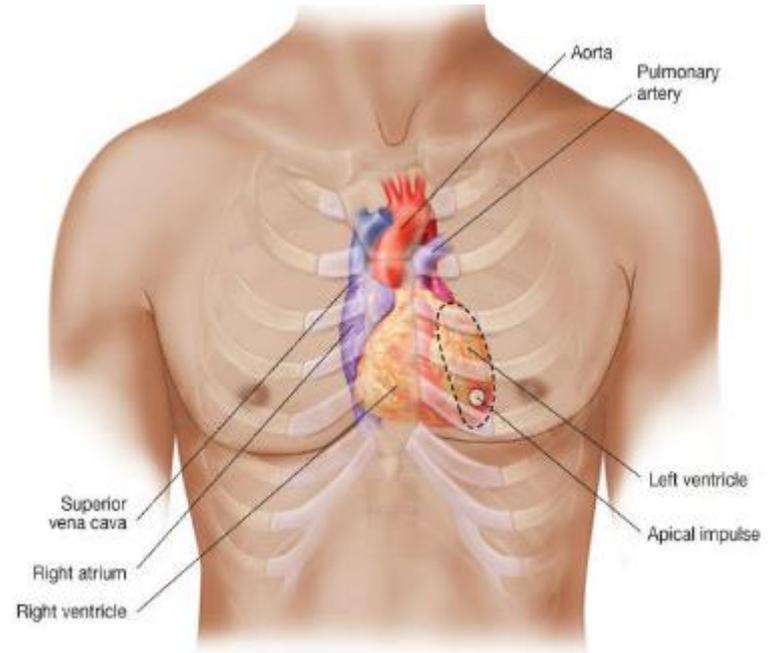


FIG. 14.6 Topographic landmarks of the chest. Seidel's Guide to Physical Examination. Ninth Edition



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Heart Layers

- The pericardium
- The epicardium
- The myocardium
- The endocardium

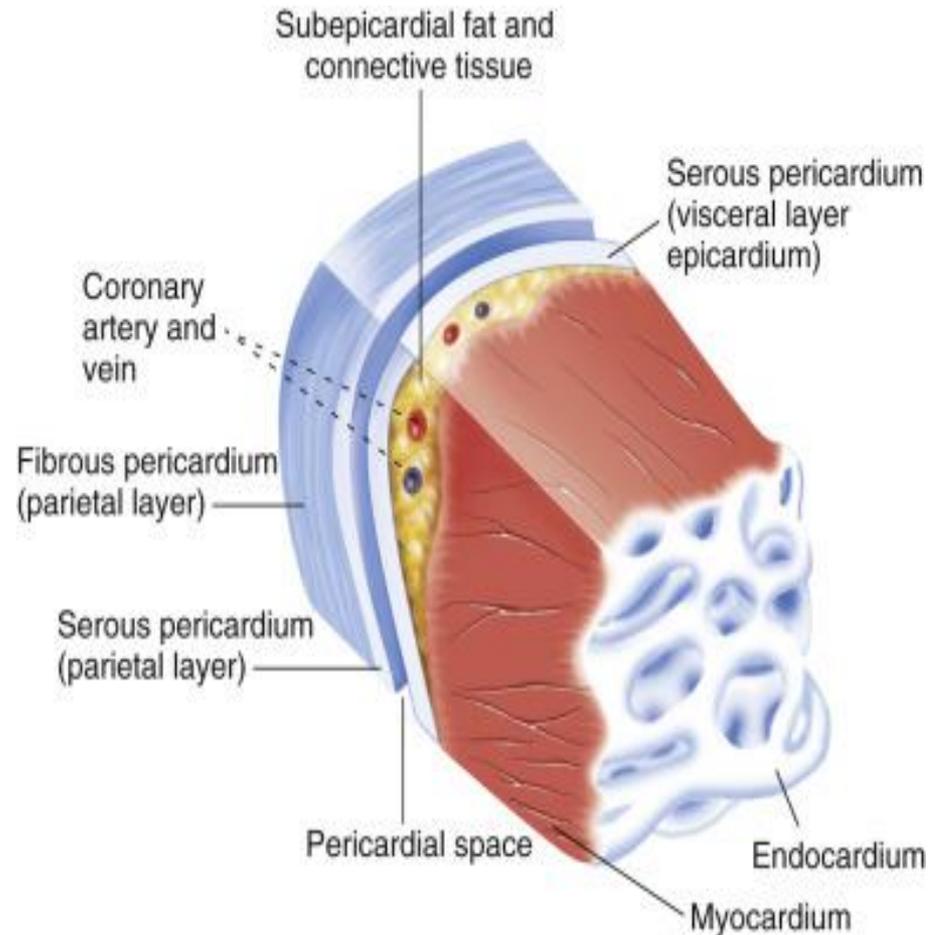


FIG. 15.3 Cross section of the cardiac muscle. Seidel's Guide to Physical examination Ninth Edition



Heart Chambers and Valves

- ~~Within the heart there are four chambers~~
 - Two atria
 - Two ventricles
- ~~The heart has four valves~~
 - Tricuspid
 - Mitral
 - Pulmonary
 - Aortic Semilunar



Heart Chambers and Valves (Cont.)

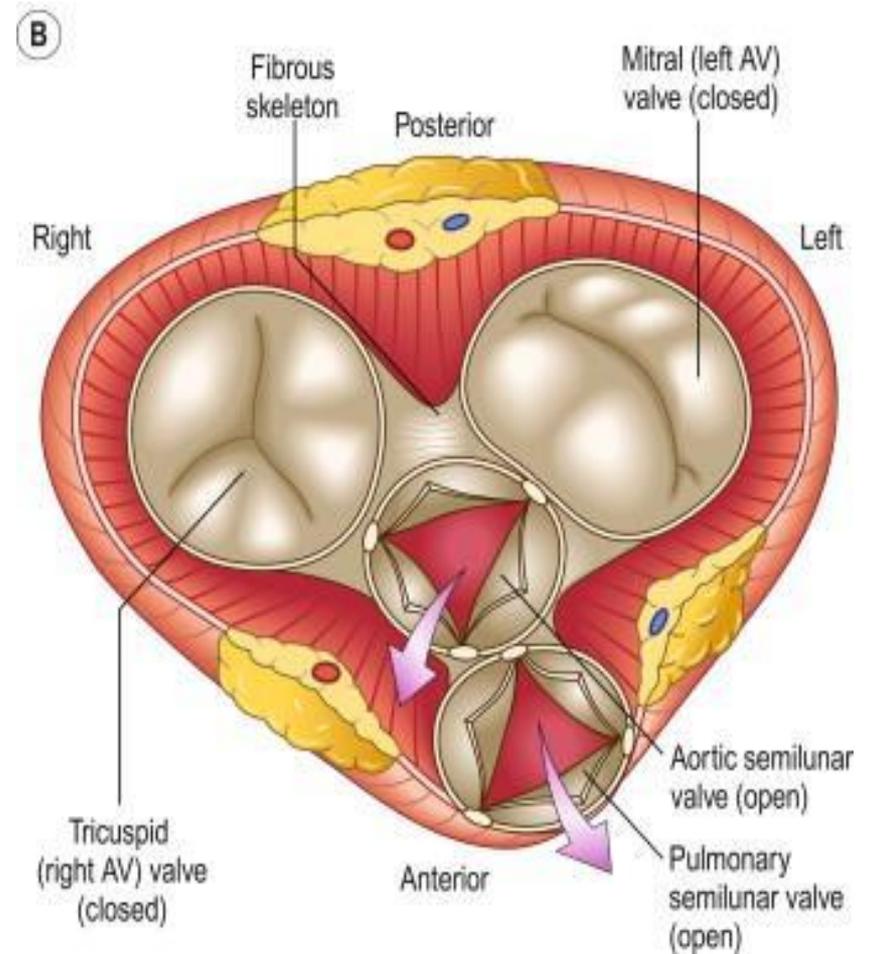
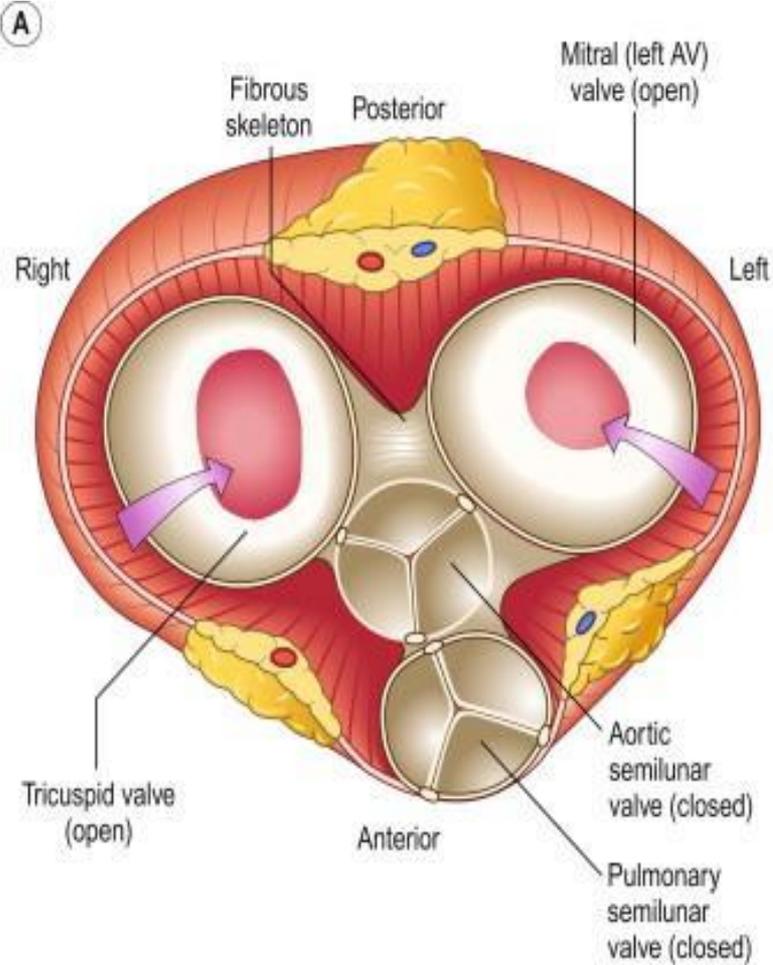


Fig.11, The cardiovascular system Archbold, Andrew; Naish, Jeannette. Published December 31, 2014. Pages 493-566. © 2015. My Athens.



Hearts Blood Flow

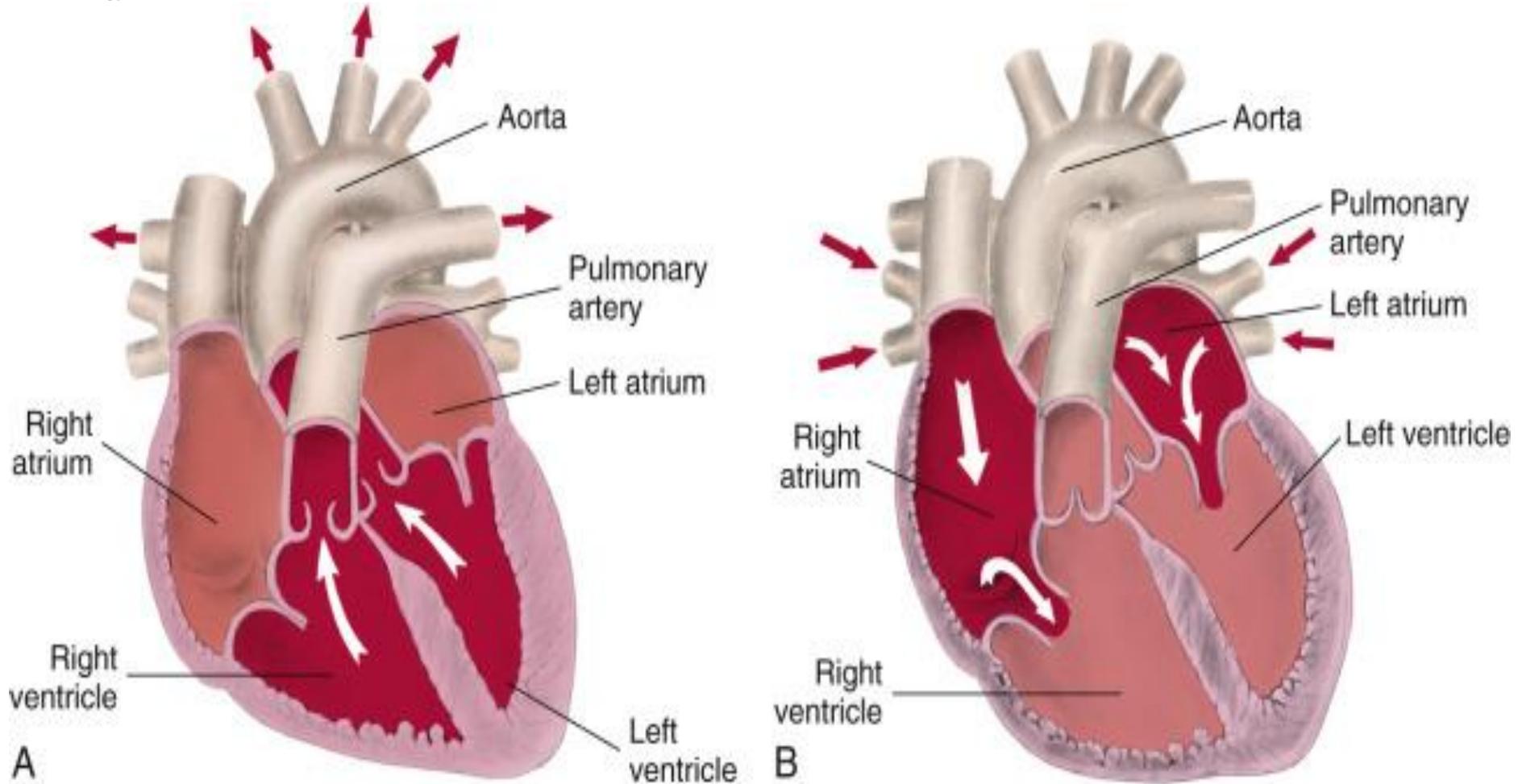
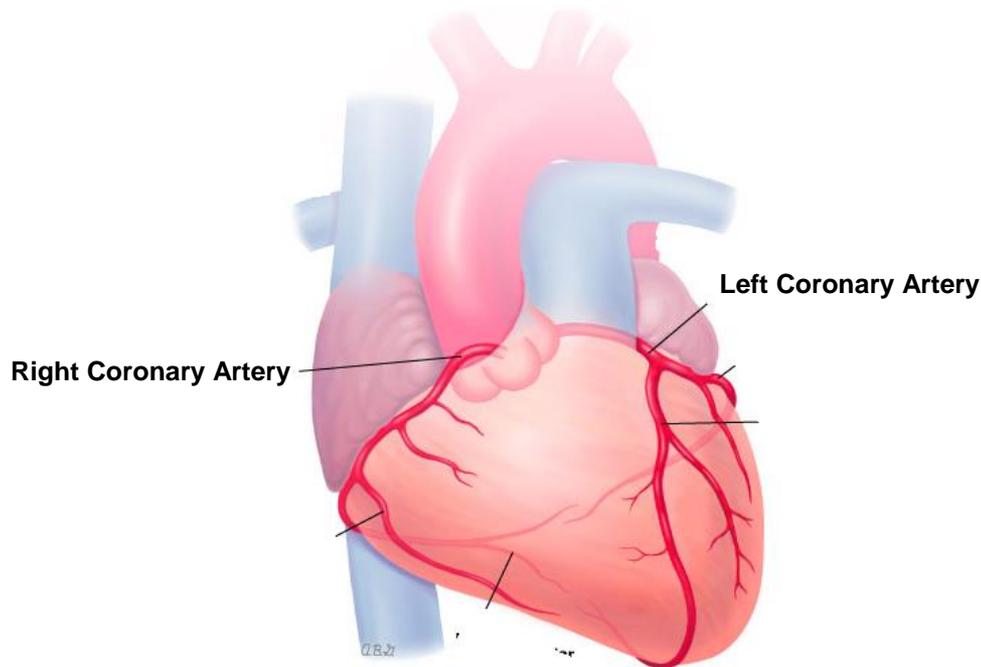


FIG. 15.6 Blood flow through the heart. Seidel's Guide to Physical examination Ninth Edition



Coronary Arteries

- The coronary arteries
 - Myocardium's own network of blood vessels



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Heart's Electrical System

- The electrical conduction system ~~controls the pace of the heart~~
- Pace maker of the heart is the SA node
- The impulse is carried to the
 - AV node
 - The Bundle of His
 - The Purkinje Fibers
 - Causing the heart to contract.



Cardiac Conduction

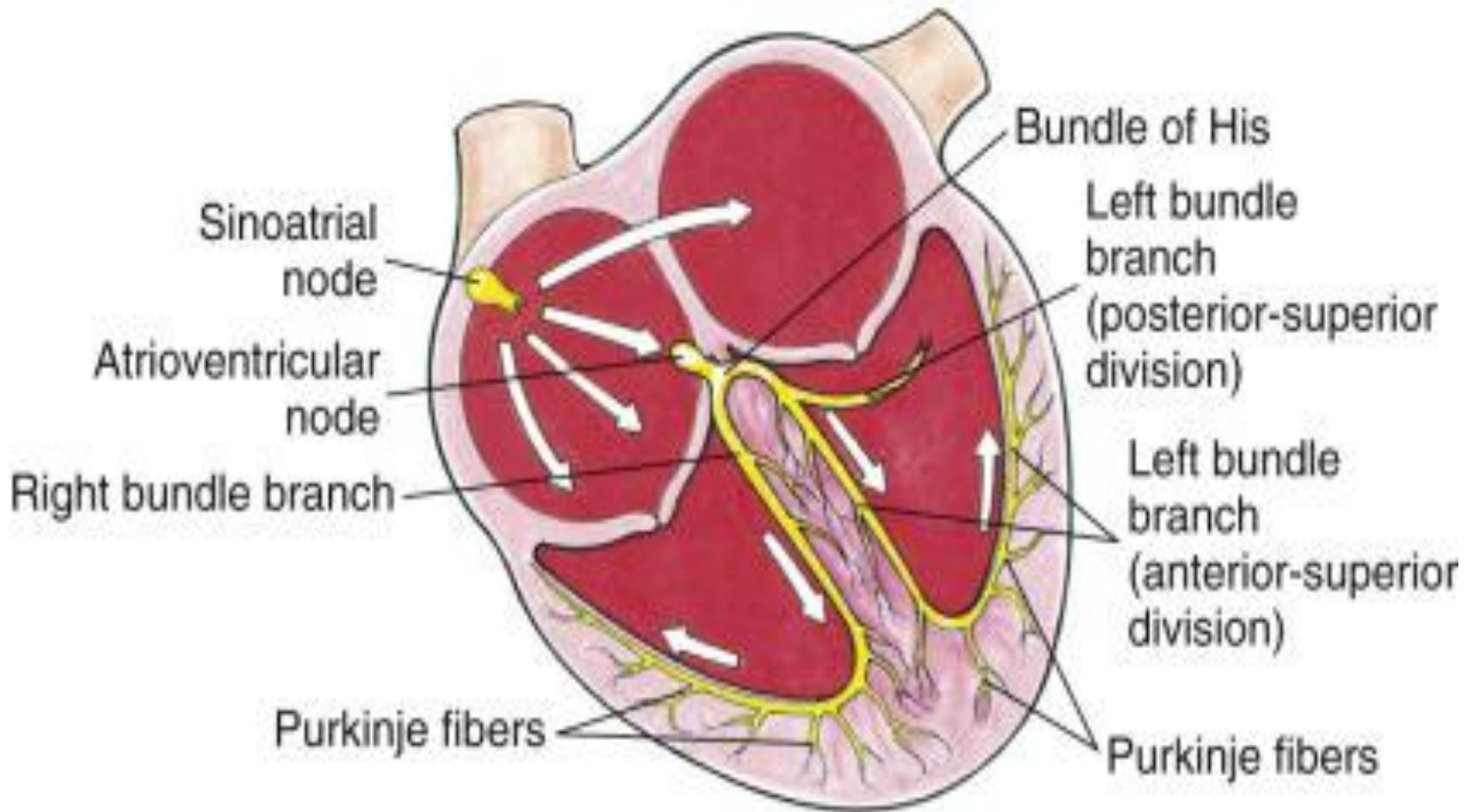


FIG. 15.8 Cardiac conduction. Seidel's Guide to Physical examination Ninth Edition



Systole and Diastole

- Systole
 - Contraction
- Diastole
 - the heart is in a relaxed phase
- Systolic pressure
 - The pressure in the arteries while the heart is contracting
- Diastolic pressure
 - the heart rests



Heart Sounds

- During each heart cycle there are four heart sounds
- Listening to the heart two sounds
- Sound One-S1 (Systole)
 - Lubb
 - Louder
 - Longer
- Sound Two-S2 (Diastole)
 - Dupp
 - Shorter



Autonomic Regulation

- Autonomic regulation of heart rate.
 - Nervous system regulation of the heart
 - The cardiovascular center then directs appropriate output
 - Sympathetic neurons
 - Parasympathetic nerve
 - Certain chemicals influence both the basic physiology of cardiac muscle and heart rate



Obtain History

- Subjective
- Chief Complaint - ex. “chest pain”
- History of present illness
 - Duration
 - Use the mnemonic “OLDCARTS” ~~to explore the complaint of pain~~
 - Anything that makes the symptoms better or worse
 - Remedies tried already



Onset

- Chronic or acute
- Insidious onset or gradual
- Attempt to obtain the time frame in
 - Days
 - Hours
 - Weeks



INDIAN OCEAN, 12.30.2017, Photo by Seaman Dalton Caples, USS SAN DIEGO (LPD 22)



Location

- Radiating down arms?
- Radiating to neck, jaws, teeth, and/or scapula?



Canadian Medical Association Journal. Yang, Jinghao Mary, Volume 184, Issue 18. Pages E993-E993. © 2012. © 2012 Thinkstock. Clinical Key, MY Athens

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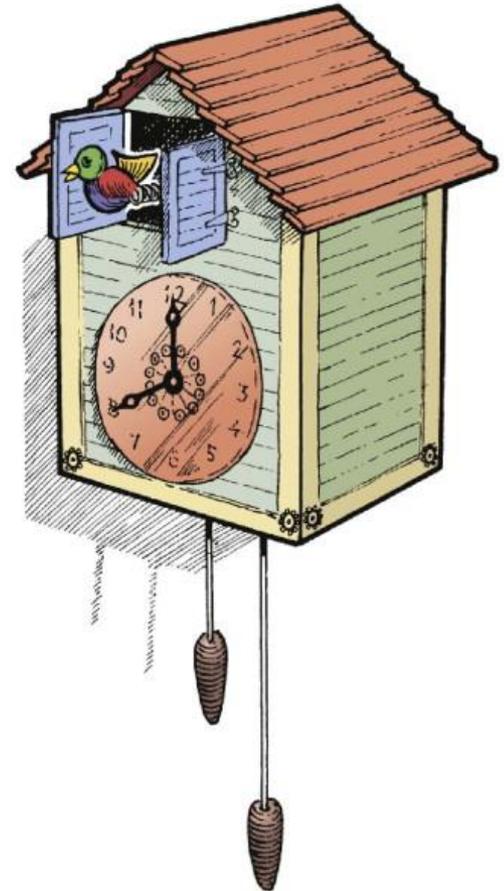
Relevant, Responsive, Requested

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Duration

- Come and go?
- Cyclic?
- Related to event such as exercise?



Essential Orthopaedics and Trauma. Dandy, David J., MD MA MChir FRCS; Edwards, Dennis J., MBChB, FRCS(Orth), Pages 445-465. © 2009. Clinical Key, My Athens

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Relevant, Responsive, Requested

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Characteristics

- Aching
- Sharp
- Tingling
- Burning
- Pressure
- Stabbing
- Crushing



Nonspecific Chest Pain, Easy-to-Read Patient Education. Published February 1, 2018.
Clinical Key, My Athens

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Relevant, Responsive, Requested

2.3-2-19



Aggravating Factors

- Made worse by exercise
- Going up stairs or uphill
- Eating
- Emotional experiences



Relieving Factors

- Made better by rest
- Sleep
- Eating
- Position



Temporal Factors

- Is there a time of day in which it is worse or better?

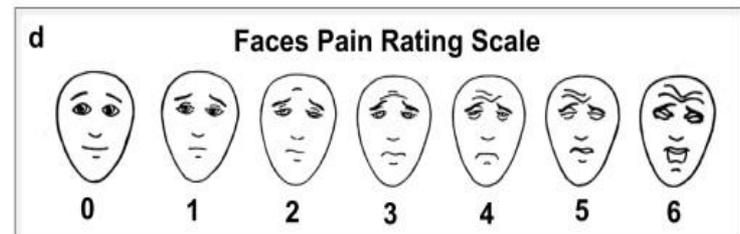
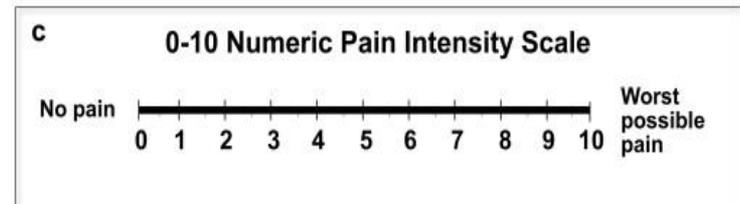
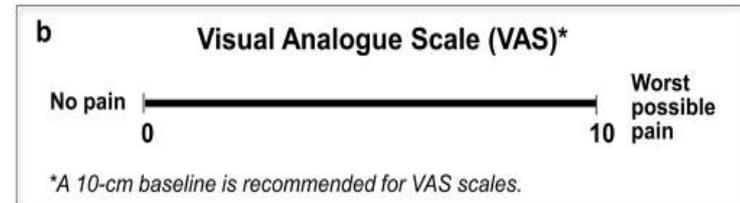
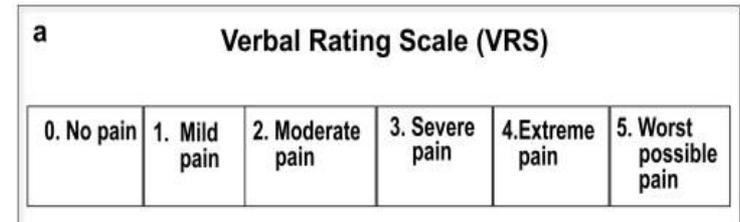


Letting the sunshine in? Lancet Haematology, The. The Lancet Haematology... Published November 1, 2014. Volume 1, Issue 2. Pages e47-e47. © 2014. Clinical Key, My Athens



Severity

- ~~How does the patient rate pain on a scale of 1 to 10?~~
- Does it disrupt sleep or activity?



How to measure chronic pain: New concepts Best Practice & Research: Clinical Rheumatology. Salaffi, Fausto; Sarzi-Puttini, Piercarlo; Atzeni, Fabiola... Published February 1, 2015. Clinical Key, My Athens



Associated Symptoms

- Shortness of breath
- Nausea, vomiting
- Numbness/tingling in upper extremities
- Shoulder pain
- Coughing, dizziness, syncope, palpitations
- Triggers



Past Medical & Surgical History

- Chronic medical conditions
- Hospitalizations
- Past Surgeries
- Medications
- Allergies to food and medications
- Family history
- Social history



Review of Systems

- Review of Systems
 - Respiratory
 - Cardiac
 - Gastrointestinal
 - Musculoskeletal
 - Psychiatric



Heart Examination

- Heart Examination
 - Blood vessel exam
- Always proceed in an orderly fashion
- Follow these steps when examining the heart
 - Inspect
 - Palpate
 - Auscultate



Heart Examination (Cont.)

- Vital Signs – Note BP (both arms), T, RR, HR, O₂, pain level
- General - Note patient's general appearance

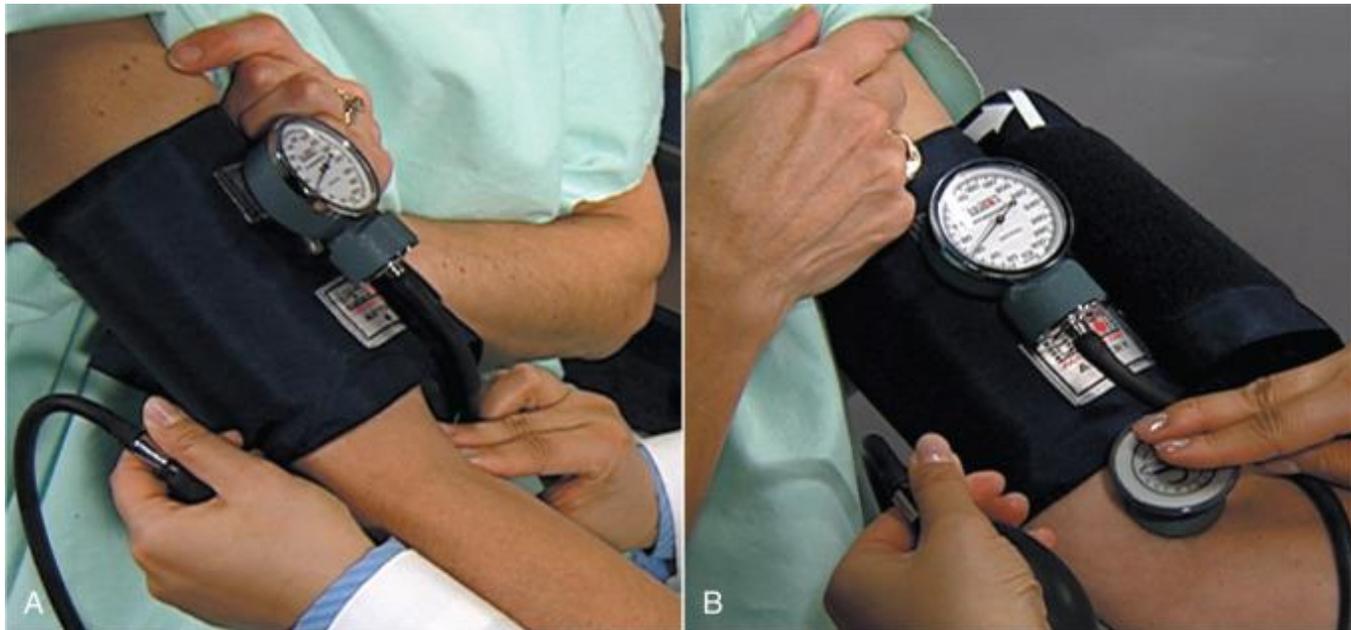


FIG. 6.4 Blood pressure measurement Seidel's Guide to Physical examination Ninth Edition, My Athens.



Inspection

- Check
 - Chest wall
 - Nails
 - Skin
 - Extremities



The History and Physical Examination
Vascular Medicine: A Companion to Braunwald's Heart Disease.
Beckman, Joshua A.; Creager, Mark A.... Published January 1, 2013. Pages 139-147. © 2013. Figure 11-9



Blood Pressure (Systolic):
Palpation Clinical Skills: Figure 5.
Published July 27, 2017.



Nursing Assessment in the Inpatient Setting Cardiac
Nursing: A Companion to Braunwald's Heart Disease.
Glotzer, Jana... Published January 1, 2008. Pages 561-574. © 2008. FIGURE 44-1



Palpation

- ~~Feel for the apical impulse at the apex~~
 - ~~Palpate over the apical or left ventricular area for the PMI~~
 - Assess the pulsation of the carotid artery with the pulsation of the apical impulse simultaneously



FIG. 15.14 Palpation of the carotid artery to time events felt over precordium. Seidel's Guide to Physical examination Ninth Edition



Palpation (Cont.)

- Compare the pulses bilaterally
 - Carotid
 - Radial
 - Femoral
 - Dorsalis pedis
 - Posterior tibialis
- ~~Compare them bilaterally~~
- Palpate (1 at a time) arteries for:
 - ~~rate, rhythm, pulse contour, amplitude, symmetry, or any obstructions to flow~~



Assessment: Cardiovascular Clinical Skills: Figure 11.
Published March 29, 2018. Palpation of radial pulse



Auscultation

- Sitting and Leaning forward
- Lying supine
- Lying in left lateral decubitus position



FIG. 3.7 Acoustic stethoscope. Seidel's Guide to Physical examination Ninth Edition



Areas of Auscultation

- Aortic valve area
- Pulmonic valve area
- Tricuspid valve area
- Mitral valve/apex of the heart

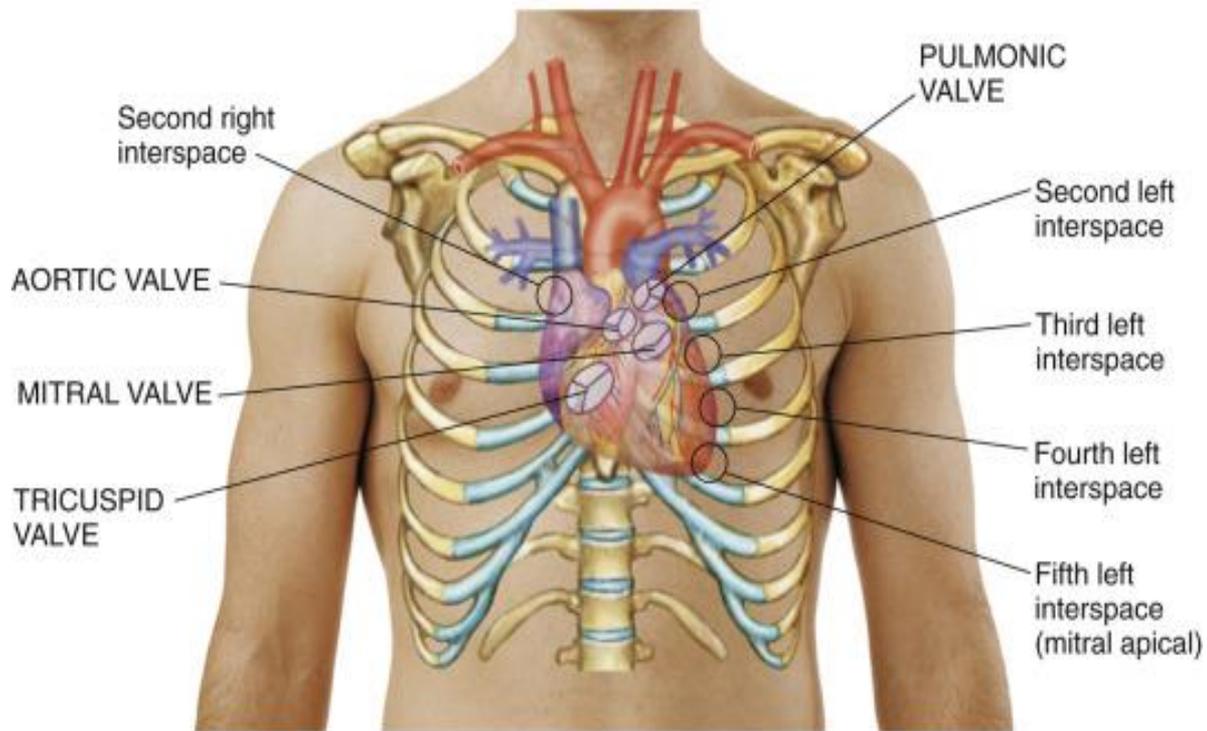


FIG. 15.15 Areas of auscultation of the heart. Seidel's Guide to Physical examination Ninth Edition



Heart Rate and Rhythm

- Have patient breath normally and note the following:
 - Rate - fast, slow?
 - Normal = 60-100
 - Bradycardia = less than 60 bpm
 - Tachycardia = greater than 100 bpm
 - Rhythm
 - Regular or irregular?



Heart Sounds

- ~~Four heart sounds (in a normal heart only the first and second heart sounds are loud enough to be heard)~~
- ~~Heart sounds~~
 - S1 best heard at mitral valve areas
 - S2 best heard at aortic and pulmonic areas
 - S3 or S4 - Murmur / Gallopiv



Peripheral Arteries

- Temporal
- Carotid
- Renal
- Abdominal aorta
- Femoral



The History and Physical Examination

Vascular Medicine: A Companion to Braunwald's Heart Disease. Beckman, Joshua A.; Creager, Mark A... Published January 1, 2013. Pages 139-147. Figure 11-11 Auscultation of carotid artery. My Athens.



Abnormal Heart Sounds

- Murmurs
 - Stenosis
 - Regurgitation
 - Shunt
 - “Whooshing”
- Pericardial friction rubs
 - A scratchy, scraping sound ~~that gets louder when patient exhales and leans forward.~~
 - Listen over the 3rd intercostal space at the left sternal border



Document Heart Sounds

- Document above locations for:
- S1, S2
 - Rate and rhythm
 - splitting sounds
 - murmurs or any extra sounds like
- S3, S4
 - Gallops
 - Rubs



Atrial Fibrillation

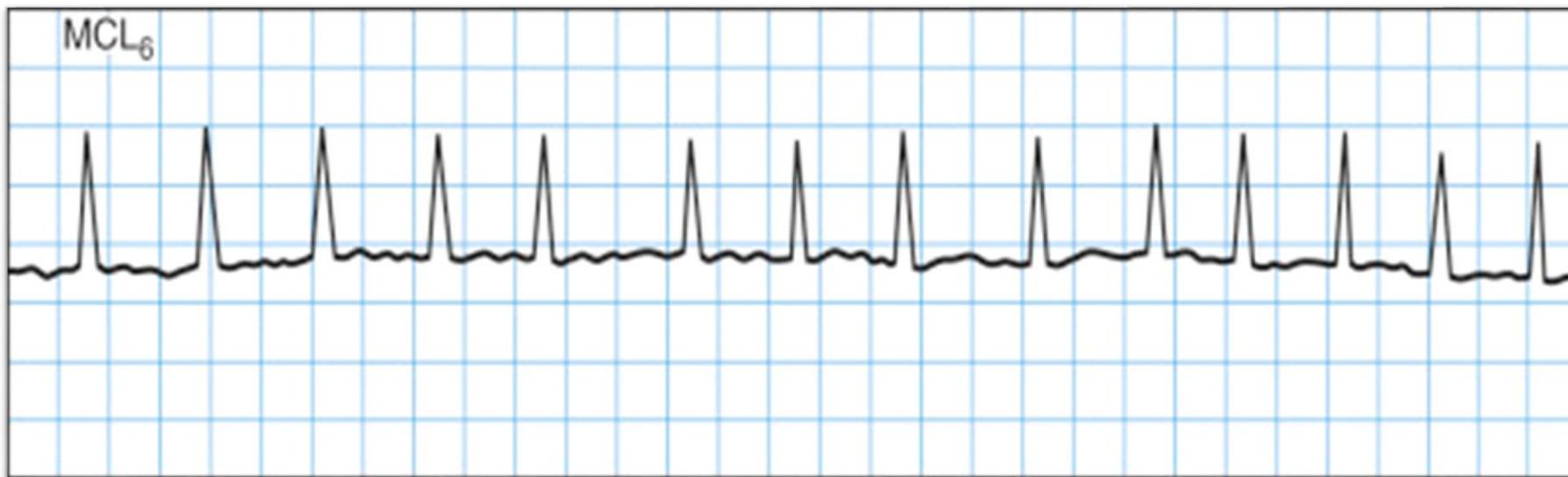


FIG. 15.6 Rhythm disturbances. Seidel's Guide to Physical examination Ninth Edition



Ventricular Fibrillation

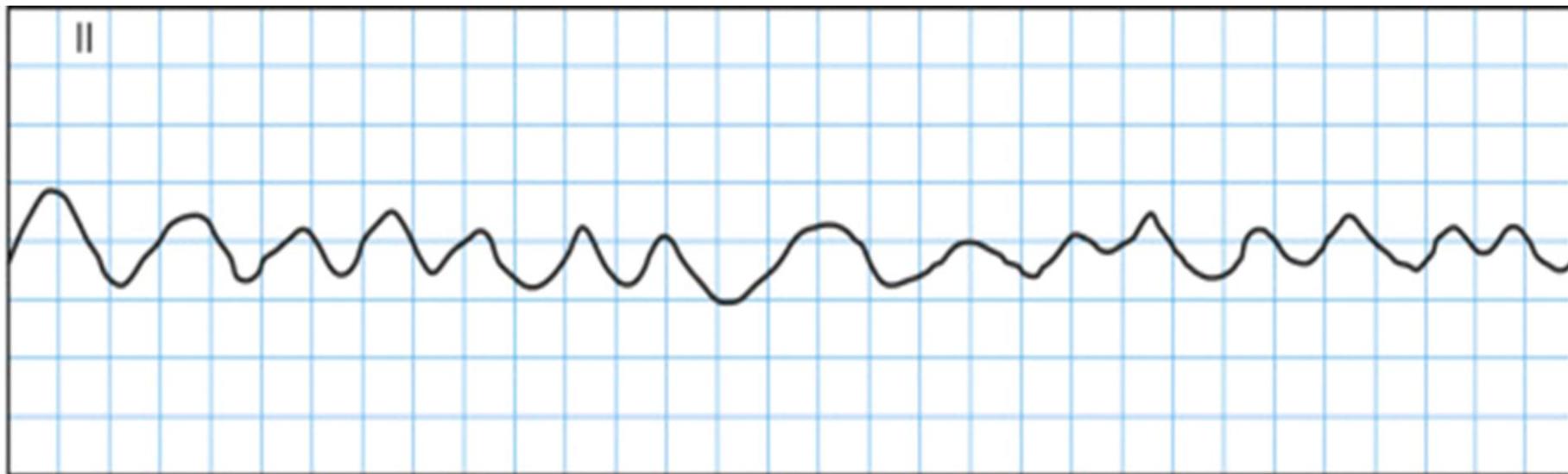


FIG. 15.6 Rhythm disturbances. Seidel's Guide to Physical examination Ninth Edition



Ventricular Tachycardia

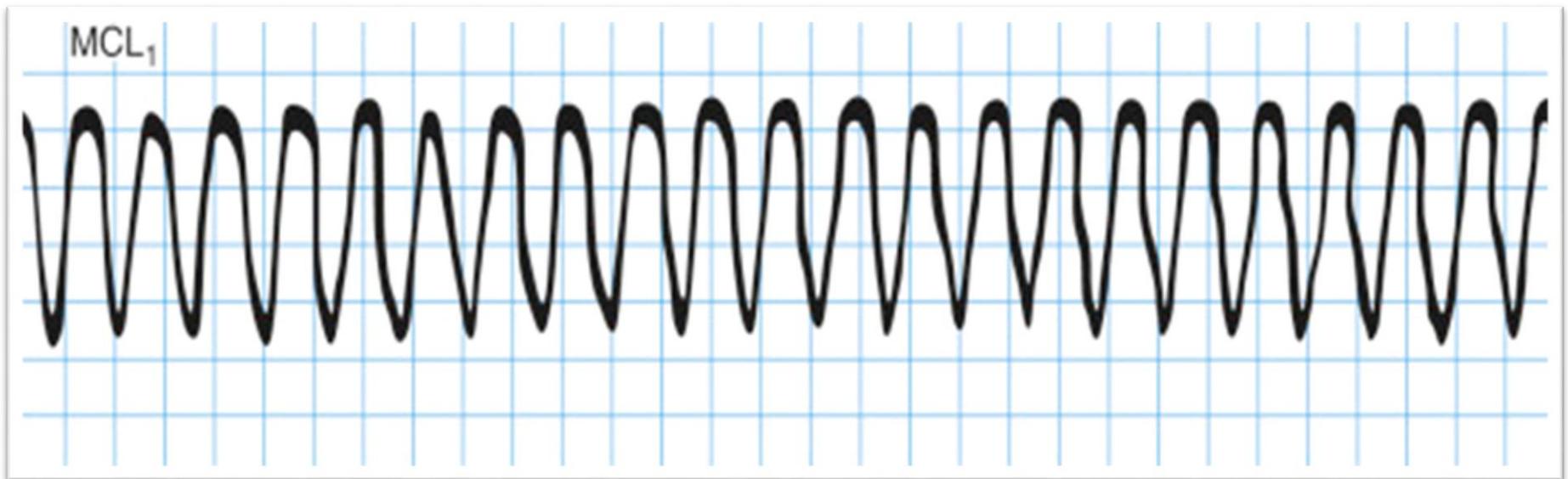


FIG. 15.6 Rhythm disturbances. Seidel's Guide to Physical examination Ninth Edition



Common Heart Disorders

- Never ignore the complaint of chest pain
- All patients presenting with this should be immediately referred to your:
 - MO
 - IDC
 - PA
 - NP



Hypertension

- High blood pressure
- Serial blood pressure checks should be done.
~~Both bilateral blood pressures and radial pulses are recorded in the AM and PM~~
- Patients could be completely asymptomatic



Signs and Symptoms

- This disease can present
 - Dizziness
 - Headaches
 - Palpitations
 - Light headedness
 - Ringing in the ears (tinnitus)
 - Chest pain
 - Dyspnea
 - Blurred vision
 - Epistaxis



Hypertension Plan

- Plan
 - Borderline hypertension can be treated with
 - Increased physical exercise
 - Better nutrition
 - Smoking cessation
 - Stress reduction and weight loss
 - Anti-hypertensive medications can only be prescribed by medical providers



Varicose Veins

- Due to incompetent venous valves
- Aggravated by
 - Pregnancy
 - Obesity
 - Prolonged standing
- May present with dull aching pain and cramping
- Examination reveal dilated veins beneath the skin
- Swelling may occur



Varicose Veins Plan

- Rest, elevation, elastic support stockings
- Surgical treatment if extensive or for cosmetic purposes



Thrombophlebitis

- Partial or complete occlusion of a vein by a thrombus
- Complaints of pain at the site of inflamed vein
- Examination reveals the following:
 - Induration
 - Swelling
 - Tenderness
 - Redness over a vein



Deep Venous Thrombosis

- Deep venous thrombosis (DVT) is the urgent nature of this condition
- Risk factors include
 - Oral contraceptives
 - Pregnancy
 - Immobilization
 - Surgery

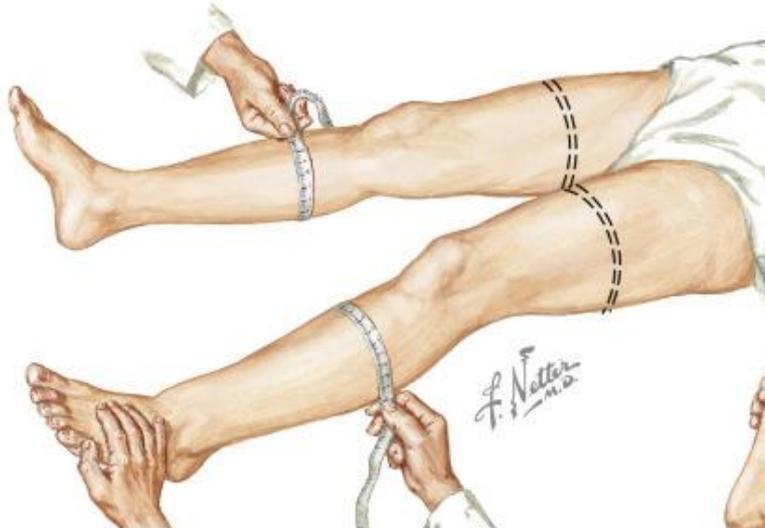


Thrombophlebitis Exam



Thrombophlebitis of small saphenous vein. Thrombosis of this or other superficial veins seldom leads to pulmonary embolism unless deep veins are also involved

In thrombosis of soleal veins there may be tenderness of calf, and tissue there may have a "doughy" feel. There may also be a difference in skin temperature between legs



In extensive thrombosis of deep veins, limb may evidence swelling, ranging from extreme to minor, or may appear relatively normal. Circumference of both legs and thighs should be measured at same levels and without compression

Dorsalis pedis pulse may be absent because of vasospasm secondary to escape of serotonin from obstructed veins



Homans sign: sharp dorsiflexion of foot with knee extended causes pain in calf resulting from tension of soleus and gastrocnemius muscles. This is evidence of calf vein thrombosis

FIG. 74.1 Clinical manifestations of leg vein thrombophlebitis. Netter's Obstetrics and Gynecology



Thrombophlebitis Exam (Cont.)

- Thrombophlebitis Exam
 - Calf pain associated with forcible dorsiflexion of the foot
 - Increased calf and thigh circumference
 - Fever
 - Difficulty ambulating due to pain
- DVTs become life threatening when the thrombus detaches and becomes an embolus



Thrombophlebitis Plan

- DVT typically requires admission for anticoagulation medication
- Superficial thrombophlebitis is treated with
 - Analgesics
 - NSAIDS
 - Rest
 - Warm compress and elevation of affected limb



Bacterial Endocarditis

- Bacterial infection of the endothelial layer of the heart.
- Patient complaints may be
 - Fever
 - Fatigue
 - Sudden onset of congestive heart failure
- Duration of illness
 - few days to a few weeks



Bacterial Endocarditis

Signs and Symptoms

- Initial signs and symptoms may cause
 - Murmur
 - Signs of neurologic dysfunction
 - Janeway lesion
 - Osler nodes

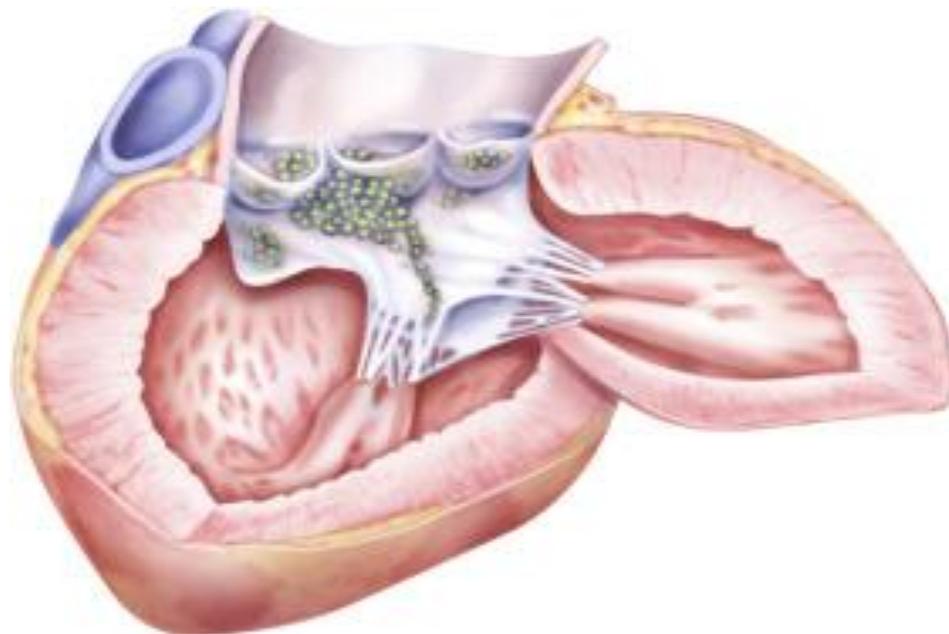


FIG. 15.21 Bacterial endocarditis. Seidel's Guide to Physical examination Ninth Edition



Bacterial Endocarditis Plan

- Cardiology
- Antibiotics
- Blood Cultures
- Modified Duke Criteria



Pericarditis

- Inflammation of the pericardium
- Often the result of viral infection
 - Echovirus
 - Coxsackie

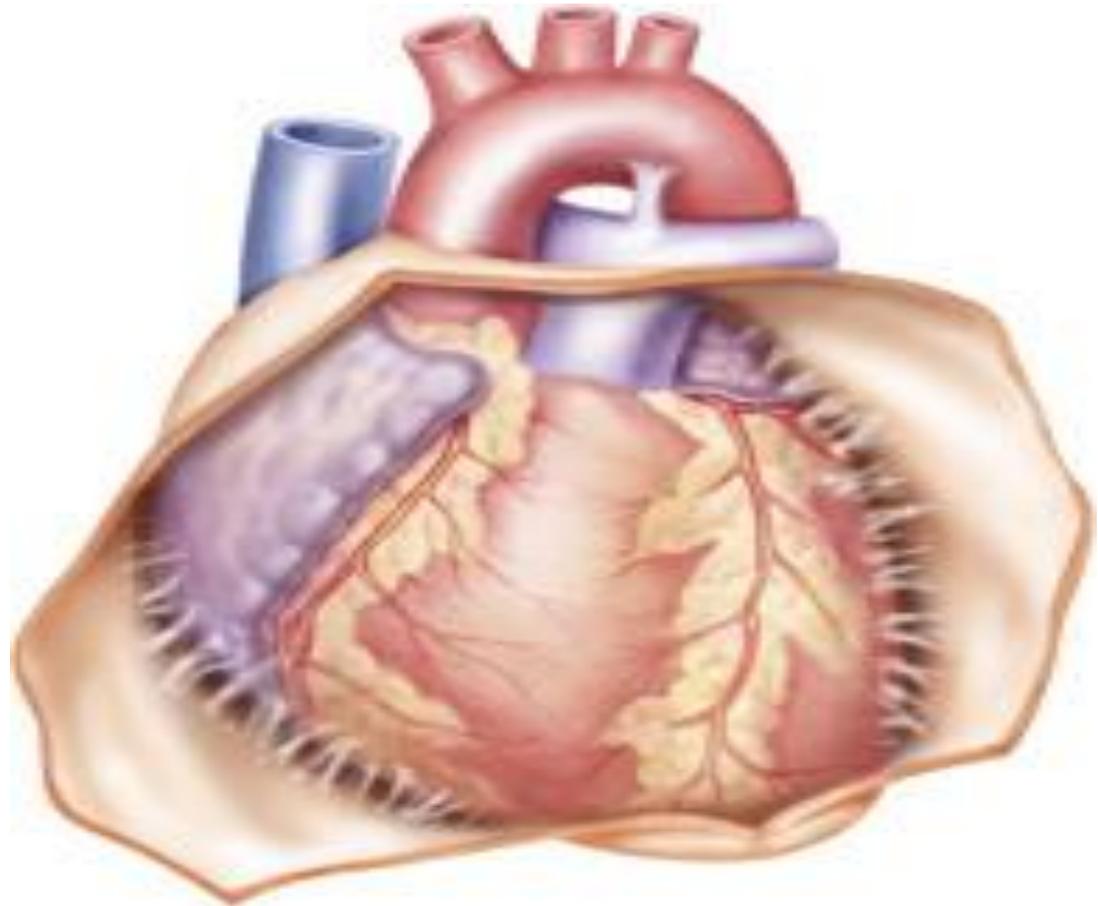


FIG. 15.22 Pericarditis. Seidel's Guide to Physical examination Ninth Edition



Pericarditis Signs and Symptoms

- Sharp and stabbing chest pain
- Pain worse with coughing, swallowing, deep breathing or lying flat
- Pain in the back, neck, or left shoulder
- Difficulty breathing when lying down
- Dry cough
- Anxiety or fatigue



Pericarditis Findings

- Examinations reveals
 - Scratchy
 - Grating
 - Tri-phasic friction rub on auscultation
 - Comprises ventricular systole
 - Early diastolic ventricular filling
 - Late diastolic atrial systole.
- Friction rub easily heard



Pericarditis Plan

- Nonsteroidal anti-inflammatory drugs are generally effective



Arrhythmias

- Abnormalities of rhythm and conduction are common
- Common arrhythmias
 - Sinus bradycardia
 - Supraventricular tachyarrhythmia
 - Ventricular arrhythmias
 - Conduction disturbances



Arrhythmias Signs and Symptoms

- Can be symptomatic or asymptomatic
 - Syncope
 - Near syncope
 - Dizziness
 - Fatigue
 - Palpations
- They can be lethal or dangerous to the extent that they reduce cardiac output



Arrhythmias Plan

- Plan
 - Treatment of arrhythmias varies
 - Antiarrhythmic drugs
 - Catheter ablation



Arrhythmias Testing

- A number of procedures are used to evaluate patients with symptoms
 - In-hospital and ambulatory ECG mentoring
 - Exercise testing
 - Catheter-based electrophysiological studies
 - Autonomic nervous system function (tilt-table testing)



Summary and Review

- 1.23 Utilize the knowledge of cardiovascular system anatomy while assessing a patient with a cardiovascular complaint
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- 1.26 Perform a heart and prominent blood vessel examination
- 1.27 State signs and symptoms of common heart disorders
- 1.16 State Red Flag criteria



Questions



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Relevant, Responsive, Requested

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Application

- Cardiovascular Job Sheet, SCSC 2.3-3
- Performance Test 4