CHAPTER 18 HEART

heart location

• mediastinum     area between lungs
  • heart
  • great vessels
  • trachea

• pericardial sac     contains heart
  • fibrous pericardium     outer tissue
  • serous membranes :
    — parietal pericardium     lines fibrous pericard
    — visceral pericardium     covers heart

heart wall

• inner lining     = endocardium
  • function :     be smooth

• muscle     = myocardium

• covering myocardium     = epicardium     = visceral pericardium

circulatory system

• systemic circuit     body
  • heart - body - heart
  • left ventricle - body - right atrium

• pulmonary circuit     lungs
  • heart     lungs - heart
  • right ventricle - lungs - left atrium

2 hearts

• right from body to lungs

• left from lungs to body

2 chambers

• upper atrium
  • receive blood
    — right atrium     from body
    — left atrium     from lungs

• lower ventricle
  • pump blood out
    — right ventricle     to lungs
    — left ventricle     to body
great vessels

• arteries out of heart
  – right ventricle pulmonary trunk
  – left ventricle aorta

• veins in to heart
  – right atrium superior vena cava
  – left atrium inferior vena cava
  – pulmonary veins

Heart Valves

• prevent backflow
  • atrioventricular valves Tricuspid
    Bicuspid = Mitral
    – prevent backflow from ventricle to atrium
  • Semilunar valves Pulmonary Aortic
    – prevent backflow from arteries to ventricles

• open and close by pressure of moving blood

heart sounds

• closing of valves
  • 1st = A-V valves close
    • ventricular systole
    • forces blood against valves
  • 2nd = Semilunar valves close
    • ventricular diastole
    • gravity from blood in arteries

other landmarks

• internal
  – interventricular septum
  – interatrial septum

• external grooves
  – coronary sulcus
  – anterior interventricular sulcus
  – posterior interventricular sulcus

right atrium

• atrium blood into heart
• right blood from body oxygenated?
  – superior vena cava
  – inferior vena cava
• push blood to right ventricle
• right A-V valve = atrioventricular valve = Tricuspid
• pectinate muscles
• fossa ovalis
left atrium
• atrium - blood into heart
• left - blood from lungs oxygenated?
  – Pulmonary veins - right and left (4)
• push blood to left ventricle
• left A-V valve - atrioventricular = Bicuspid valve = Mitral valve
• pectinate muscles
• fossa ovalis

right ventricle
• right - blood from right atrium
• ventricle - blood to lungs
  – Chordae Tendineae
  – Papillary muscle
  – trabeculae carneae
• pumps blood to lungs
• Pulmonary trunk (artery)
• Pulmonary semilunar valve

left ventricle
• left - blood from left atrium
• ventricle - blood to body
  – thickest muscle wall of heart
  – Chordae Tendineae
  – Papillary muscle
  – trabeculae carneae
• Aorta
• Aortic semilunar valve

major blood vessels
• right side: from body to lung
  – superior vena cava fr. head to R. atrium
  – inferior vena cava fr. body to R. atrium
  – pulmonary trunk fr. R. ventricle to lung
• left side: from lung to body
  – pulmonary veins fr. lung to L. atrium
  – aorta fr. L. ventricle to body

Coronary circulation
• coronary arteries
  • left coronary artery
    – anterior interventricular artery
    – circumflex artery
  • right coronary artery
    – marginal artery
    – posterior interventricular artery
• cardiac veins
  • coronary sinus return to right atrium
  • great cardiac vein
  • middle cardiac vein

  cardiac muscle tissue

• striated (sarcomeres), involuntary
• short cells
• branched arrangement
• intercalated discs specialized connections betw cells
  – desmosomes
  – gap junctions
• functional syncytium all cells contract simultaneously

  conduction system

• autorhythmic cells noncontractile cardiac cells
  – depolarize without nerve stimulation
• conduction pathway:
  – S-A node
  – internodal pathway
  – A-V node
  – A-V bundle (bundle of His)
  – bundle branches
  – Purkinje fibers

  innervation of heart

• vital signs what part of brain?
• cardioaccelerator center
  – S-ANS to S-A node and pathway effect?
• cardioinhibitory center
  – P-ANS to S-A node and A-V node effect?

  Arrhythmia

• irregular heart beat and sounds
• bradycardia slow rate < 60
• tachycardia fast rate > 100
• palpitation brief, temporary arrhythmia
• flutter fast, consistent heart rate > 200
• fibrillation fast, uncoordinated > 300 ventricles contract w/o filling
• PVC = premature ventricular contraction
  occcasional, irreg. ventricular contraction
  cardiac muscle become conductive
• asystole no contractions
cardiac disease (for reference only)

- MI myocardial infarction
- CAD coronary artery disease
- CHF congestive heart failure
- MVP mitral valve prolapse
- Mitral stenosis decreased size of opening in valve
- Angina brief pain of coronary artery origin
- Rheumatic heart disease Strep infection
- arrhythmia

- Atherosclerosis decreased lumen due to plaques
- ischemia decreased blood supply
- infarct destroyed myocardium
- bypass surgery new Coronary circulation
- angioplasty surgical repair of blood vessels
- stent device that holds coronary vessels open